Historic, Archive Document

Do not assume content reflects current scientific knowledge, policies, or practices.





WATER SUPPLY OUTLOOK FOR MONTANA

and FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

UNITED STATES DEPARTMENT of AGRICULTURE...SOIL CONSERVATION SERVICE, and MONTANA AGRICULTURAL EXPERIMENT STATION

Data included in this report were obtained by the agencies named above in cooperation with Federal, State, and private organizations listed on the inside back cover of this report.

SNOW PILLOW RECORDS 1970 WATER YEAR

TO RECIPIENTS OF WATER SUPPLY OUTLOOK REPORTS:

Most of the usable water in western states originates as mountain snowfall. This snowfall accumulates during the winter and spring, several months before the snow melts and appears as streamflow. Since the runoff from precipitation as snow is delayed, estimates of snowmelt runoff can be made well in advance of its occurrence. Streamflow forecasts published in this report are based principally on measurement of the water equivalent of the mountain snowpack.

Forecasts become more accurate as more of the data affecting runoff are measured. All forecasts assume that climatic factors during the remainder of the snow accumulation and melt season will interact with a resultant average effect on runoff. Early season forecasts are therefore subject to a greater change than those made on later dates.

The snow course measurement is obtained by sampling snow depth and water equivalent at surveyed and marked locations in mountain areas. A total of about ten samples are taken at each location. The average of these are reported as snow depth and water equivalent. These measurements are repeated in the same location near the same dates each year.

Snow surveys are made monthly or semi-monthly from January 1 through June 1 in most states. There are about 1400 snow courses in Western United States and in the Columbia Basin in British Columbia. In the near future, it is anticipated that automatic snow water equivalent sensing devices along with radio telemetry will provide a continuous record of snow water equivalent at key locations.

Detailed data on snow course and soil moisture measurements are presented in state and local reports. Other data on reservoir storage, summaries of precipitation, current streamflow, and soil moisture conditions at valley elevations are also included. The report for Western United States presents a broad picture of water supply outlook conditions, including selected streamflow forecasts, summary of snow accumulation to date, and storage in larger reservoirs.

Snow survey and soil moisture data for the period of record are published by the Soil Conservation Service by states about every five years. Data for the current year is summarized in a West-wide basic data summary and published about October 1 of each year.

PUBLISHED BY SOIL CONSERVATION SERVICE

The Soil Conservation Service publishes reports following the principal snow survey dates from January 1 through June 1 in cooperation with state water administrators, agricultural experiment stations and others. Copies of the reports for Western United States and all state reports may be obtained from Soil Conservation Service, Western Regional Technical Service Center, Room 209, 701 N. W. Glisan, Portland, Oregon 97209.

Copies of state and local reports may also be obtained from state offices of the Soil Conservation Service in the following states:

STATE	ADDRESS
Alaska	P. O. Box "F", Palmer, Alaska 99645
Arizona	6029 Federal Building, Phoenix, Arizona 85025
Colorado (N. Mex.)	12417 Federal Building, Denver, Colorado 80202
Idaho	Room 345, 304 N. 8th. St., Boise, Idaho 83702
Montana	P. O. Box 98, Bozeman, Montana 59715
Nevada	P. O. Box 4850, Reno Nevada 89505
Oregon	1218 S. W. Washington St., Portland, Oregon 97205
Utah	4012 Federal Building, Salt Lake City, Utah 84111
Washington	360 U.S. Court House, Spokane, Washington 99201
Wyoming	P. O. Box 340, Casper, Wyoming 82601

PUBLISHED BY OTHER AGENCIES.

Water Supply Outlook reports prepared by other agencies include a report for California by the Water Supply Forecast and Snow Surveys Unit, California Department of Water Resources, P. O. Box 388, Sacramento, California 95802 --- and for British Columbia by the Department of Lands, Forests and Water Resources, Water Resources Service, Parliament Building, Victoria, British Columbia

WATER SUPPLY OUTLOOK FOR MONTANA

and FEDERAL - STATE - PRIVATE COOPERATIVE SNOW SURVEYS

Issued by

KENNETH E. GRANT

ADMINISTRATOR
SOIL CONSERVATION SERVICE
WASHINGTON, D.C.

Released by

A. B. LINFORD

STATE CONSERVATIONIST SOIL CONSERVATION SERVICE Bozeman, Montana

In Cooperation with

J. A. ASLESON

DIRECTOR

Montana Agricultural Experiment Station

Report prepared by

P. E. FARNES, Snow Survey Supervisor

SOIL CONSFRVATION SERVICE P.O. Box 98 Bozeman, Montana 59715



TABLE OF CONTENTS

MONTANA WATER SUPPLY OUTLOOK	Page 1-2
SOIL MOISTURE DATA	3-6
RESERVOIR STORAGE DATA	7
SNOW PILLOW DATA Columbia Drainage Kootenai River	
Banfield Mountain	8
Garver Creek	9
Hawkins Lake	10
Poorman Creek	11
Flathead River	
Flattop Mountain	12
Clark Fork River	
Black Pine	13
Hoodoo Basin	14
North Fork Elk Creek	15
Bitterroot River	
Saddle Mountain	16
Twelvemile Creek	17
Twin Lakes	18
Missouri Drainage	
Jefferson River	
Rocker Peak	19
Madison River	
Lion Mountain	20
Madison Plateau	21
West Yellowstone	22
Gallatin River	
Bangtail	23
Bridger Bowl	24
Carrot Basin	25
Lick Creek	26
Maynard Creek	27
Shower Falls	28
Taylor Peaks	29
Missouri Main Stem	_,
Deadman Creek	30
Milk River	
Rocky Boy	31
Sun-Teton-Marias	0.1
Mount Lockhart	32
Waldron	33
Judith River	33
Spur Park	34
Upper Yellowstone River	,
Fisher Creek	35
Northeast Entrance	36
	33
MAP OF SNOW COURSES AND SOIL MOISTURE STATIONS	
COOPERATORS	Cover



MONTANA FALL RESUME October 1, 1970

COLUMBIA RIVER BASIN

Valley precipitation has been above average since April 1 in all drainages with the exception of the Kootenai. There was a noticeable lack of precipitation during the main melt period which helped peak flows. Streamflow in general varied from 90 to 100 percent. Seasonal total in the Kootenai was near 70 percent average, reflecting the well below average accumulation of mountain snow pack. Temperatures remained below average until mid-May, then continued near or above average for the remainder of the growing season. The above average temperatures and adequate water supplies provided excellent crop growth.

Irrigation reservoir storage is low but no problems are anticipated if runoff is near average next season. Mountain soils are generally drier than normal and will reduce runoff next season unless they become saturated before snow accumulation.

MISSOURI RIVER BASIN

The total valley precipitation since April 1 has been above average in all areas with the exception of the northcentral and central portions of the state. June rains were light in most areas, minimizing the problem of moving the large snow pack downstream. The Gallatin recorded the largest peak flow of this century and consisted of snowmelt without rain. The large Madison peak flow was from snowmelt with some rain.

Most southern drainages recorded above average peak flows. Total runoff was well above average in southwestern Montana. Provisional data indicated flows of 150 percent average at the Missouri headwaters. Streams flowing east from the Continental Divide north of Helena had near to below average runoff. Above average temperatures during the main growing period resulted in good crop production, but also caused large irrigation withdrawals. Water supplies were generally adequate for all areas.

Storage in irrigation reservoirs is generally below average but no problems are anticipated unless snow packs are well below average this winter. Mountain soils are generally drier than normal.

YELLOWSTONE RIVER BASIN

The accumulation of valley precipitation since April 1 in the headwaters areas has been above average. Much damage from peak flows was averted by lack of rain during the main melt period and a cooler period just as snowmelt was nearing maximum proportions. Streamflow totals for the season were well above average with all streams producing 15 to 30 percent more than their normal amounts. The April through September volume passing by Billings in the Yellowstone River was about 130 percent average.

Mountain soils are somewhat drier than usual, but are not expected to have any significant effect on next year's runoff unless the winter snow pack is well below average.

DRAINAGE BASIN and/or STATION

Profile (Inches)

Soil Moisture (Inches)

Name	Elevation	Depth	Capacity	Date of Survey	This Year	Last Year	Average +
	COLUMBIA	RIVER	BASIN				
Kootenai							
Baree Trail	3800	48	7.5	7/13	3.6	5.7	5.4
Murphy Lake R. S.	3000	48	22.6	7/01	19.2	22.6	20.7
Raven R. S.	3050	48	23.0	7/13	17.9	17.9	19.0
Flathead				- /			
Desert Mountain	5600	54	8.4	•	8.5		
Marias Pass	5250	54	6.5	6/28	5.5	5.9	5.3
Clark Fork	7100	4.0	10.0	7 /01	0.0	0.0	0 7
Black Pine	7100	48	10.0	7/01	9.8	8.8	8.7
Seeley Lake R. S.	4030	48	11.9	7/01	10.0	- 10 /	10.0
Skalkaho Summit	7260	48	10.8	7/01	10.2	10.4	10.2
Bitterroot Cibbona Page	7100	48	7 1	6/26	6 6	6 6	6 1.
Gibbons Pass Lolo Pass	7100 5250	48	7.1 10.6	6/26 6/29	6.6 10.0	6.6 9.0	6.4 9.6
LOTO FASS	3230	40	10.0	0/29	10.0	9.0	9.0
<u> 1</u>	MISSOURI	RIVER	BASIN				
Beaverhead	(700		1.5.0	- /01	1	10.0	10.0
Lakeview	6700	48	15.3	7/01	15.8	10.2	12.9
Madison	6700	/ 0	C =	(/ 0 0	0 0	0.0	
West Yellowstone	6700	48	6.5	6/28	2.8	2.8	-
Gallatin	7070			<i>.</i>			4.6
Bridger Bowl	7250	48	17.0	6/30	16.4	16.7	
College Site Lick Creek	4856	54	14.5	7/02	10.4	15.1	11.5
Twenty-One Mile	6860 7150	48	18.8 10.0	6/29 6/28	16.6 9.0	-	18.5 8.6
Twenty-One mile	, 150	48	10.0	0/28	9.0	9.3	8.0
Missouri Main Stem	7/.20	10	11 0	(12)	10.0	11 0	10.0
Kings Hill	7420	48	11.8	6/26	10.8	11.0	10.8
Stemple Pass	6350	48	5.9	6/30	5.5	5.6	5.1
Milk Beaver Creek	2050	/. 0	20.0	6/00	10 (
Rocky Boy	3950	48	20.9	6/29	12.6	-	-
ROCKY DOY	3950	36	10.1	6/29	9.7	-	-
Yellowstone Battle Ridge	6020	48	17.6	6/20	1/. 5	16 1	15 1
Northeast Entrance	7350	48 48	9.4	6/29 7/01	14.5 8.2	16.1 10.4	15.1 9.3
NOT CHEASE ENCLANCE	7330	40	7.4	//01	0.2	10.4	7.3



SOIL MOISTURE

DRAINAGE BASIN and/or STATION		Profile (Inches)		Date of	Soil Moisture (Inches)		
Name	Elevation	Depth	Capacity	Survey	This Year	Last Year	Average +
<u>C</u>	COLUMBIA	RIVER	BASIN				
		•					
Kootenai Baree Trail	3800	48	7.5			3.1	3.8
	3000	48	22.6	8/03	18.8	19.2	18.9
Murphy Lake R. S. Raven R. S.	3050	48	23.0	0/03	10.0	18.1	18.2
Ravell R. D.	3030	40	23.0			10.1	10.2
Flathead							
Desert Mountain	5600	54	8.4	8/04	7.9	6.8	6.3
Marias Pass	5250	54	6.5	7/29	4.4	4.3	3.8
Clark Fork	7100	4.0	10.0	7/20	0 0	0 0	0 (
Black Pine	7100	48	10.0	7/30	9.2	8.8	8.6
Seeley Lake R. S.	4030 7260	48	11.9 10.8	7/30	10.6	7.7 9.4	7.6 10.0
Skalkaho Summit	7260	48	10.0	7/30	10.0	9.4	10.0
Bitterroot							
Gibbons Pass	7100	48	7.1	7/31	5.7	4.9	4.6
Lolo Pass	5250	48	10.6	7/30	6.5	4.9	5.8
<u>M</u>	IISSOURI	RIVER	BASIN				
Beaverhead							
Lakeview	6700	48	15.3	7/31	9.3	6.3	8.2
Madison				- /			
West Yellowstone	6700	48	6.5	7/29	2.1	-	-
Gallatin							
Bridger Bowl	7250	48	17.0			14.8	15.5
College Site	4856	54	14.5	7/30	11.0	11.1	8.3
Lick Creek	6860	48	18.8	8/19	15.4	16.0	15.5
Twenty-One Mile	7150	48	10.0	7/29	7.2	_	5.1
Missouri Main Stem							
Kings Hill	7420	48	11.8	7/31	8.9	9.4	9.2
Stemple Pass	6350	48	5.9	7/31	4.2	4.6	4.2
Milk							
Beaver Creek	3950	48	20.9	7/31	7.1	13.4	_
Rocky Boy	3950	36	10.1	7/31	7.9	8.4	-
	3,30	3 0	-001	., 51	, , ,	0 0 1	
Yellowstone							
Battle Ridge	6020	48	17.6			12.8	11.2
Northeast Entrance	7350	48	9.4	7/29	6.3	7.4	6.9

⁻⁴⁻

⁺ Average for period of record.



SOIL MOISTURE

DRAINAGE BASIN and/or STATION	1	Profile (Inches)			Soil Moisture (Inches)		
Name	Elevation	Depth	Capacity	Date of Survey	This Year	Last Year	Average +
	COLUMBIA	RIVER	BASIN				
Kootenai							
Baree Trail	3800	48	7.5			2.3	4.6
Murphy Lake R. S.	3000	48	22.6	9/01	18.2	18.3	19.0
Raven R. S.	3050	48	23.0			18.1	17.4
Flathead							
Desert Mountain	5600	54	8.4	9/01	4.8	4.7	5.2
Marias Pass	5250	54	6.5	8/28	3.7	3.2	3.5
Clark Fork							
Black Pine	7100	48	10.0	8/28	8.0	7.8	8.2
Seeley Lake R. S.	4030	48	11.9	•	3.9	_	-
Skalkaho Summit	7260	48	10.8	* .	10.0	8.6	9.7
	, 200		2000	0, -0			
Bitterroot				- /			
Gibbons Pass	7100	48	7.1		2.9		4.3
Lolo Pass	5250	48	10.6	8/28	4.0	-	4.6
	MT GOODD T	DIVED	DAGTN				
	MISSOURI	RIVER	BASIN				
Beaverhead	6700	4.0	15.0	0 /01	7.0	5 0	6.0
Lakeview	6700	48	15.3	8/31	7.8	5.8	6.8
Madison							
West Yellowstone	6700	48	6.5	8/30	1.2	1.2	-
Gallatin							
Bridger Bowl	7250	48	17.0	9/09	16.5	15.9	16.0
College Site	4856	54	14.5	8/28	9.5	12.3	7.8
Lick Creek	6860	48	18.8	9/10	18.8	14.8	16.0
Twenty-One Mile	7150	48	10.0	8/30	3.2	3.4	3.7
Missouri Main Stem	•						
Kings Hill	7420	48	11.8	8/28	6.1	7.2	8.1
Stemple Pass	6350	48	5.9		3.6	3.0	4.0
Milk							
Beaver Creek	3950	48	20.9	8/31	6.0	7.9	-
Rocky Boy	3950	36	10.1	8/31	6.7	6.5	-
Yellowstone							
Battle Ridge	6020	48	17.6			9.2	9.5
Northeast Entrance	7350	48	9.4	8/26	5.0	5.1	5.8
				- ,	2,5		_ , ,

⁻⁵⁻

⁺ Average for period of record.



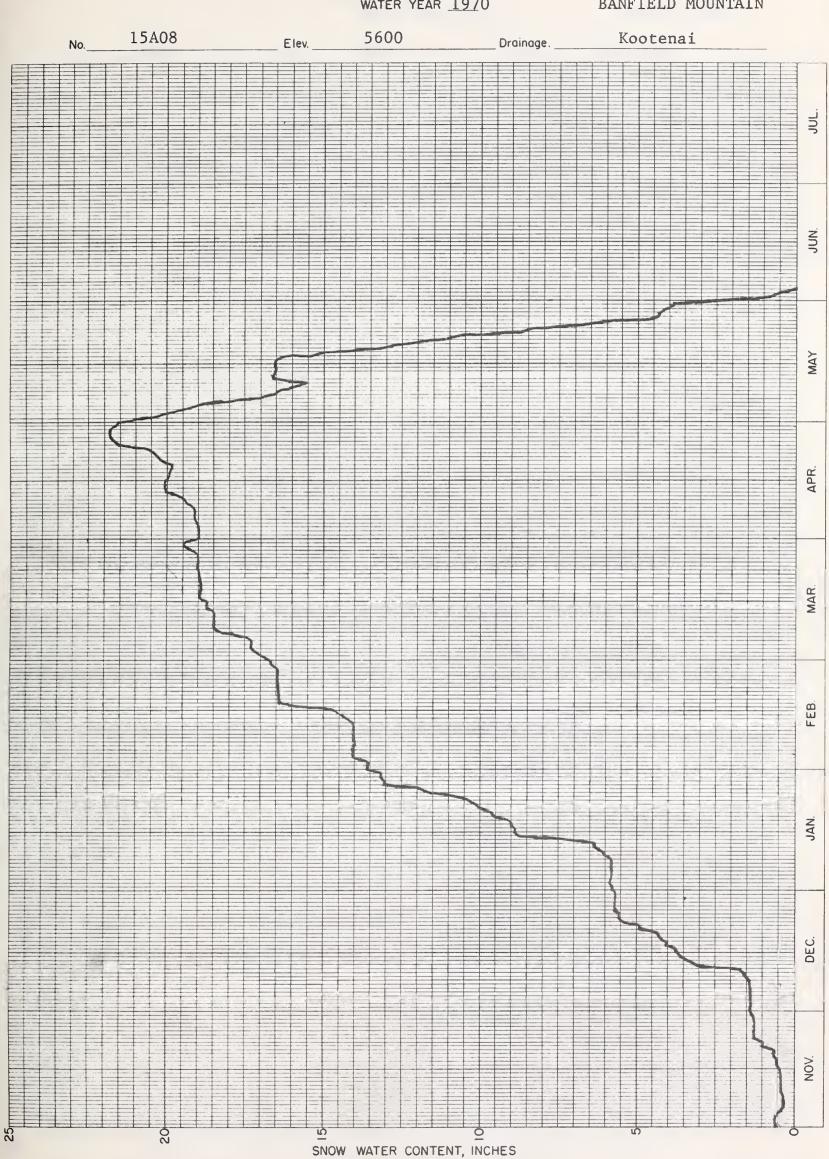
DRAINAGE BASIN and/or STATION		Profile (Inches)		Date of	Soil Moisture (Inches)		
Name	Elevation	Depth	Capacity	Survey	This Year	Last Year	Average +
	OTIMDTA	חשוודם	RACTM				
<u>-</u>	OLUMBIA	KIVEK	DASIN				
Kootenai							
Baree Trail	3800	48	7.5			_	5.2
Murphy Lake R. S.	3000	48	22.6			18.8	18.6
Raven R. S.	3050	48	23.0			18.6	18.4
Flathead							
Desert Mountain	5600	54	8.4			6.3	5.8
Marias Pass	5250	54	6.5	9/27	3.9	3.6	3.9
Clark Fork							
Black Pine	7100	48	10.0	9/28	8.2	7.5	7.9
Seeley Lake R. S.	4030	48	11.9	10/1	3.8	4.0	4.5
Skalkaho Summit	7260	48	10.8	9/28	10.4	10.2	10.3
Bitterroot	7100	4.0	- 1	0 / 0 0	5 0	0 /	, ,
Gibbons Pass	7100	48	7.1	9/29	5.3		4.6
Lolo Pass	5250	48	10.6	9/28	4.2	3.2	5.0
24	TCCOIDT	DIVED	D A CTN				
<u>M</u>	ISSOURI	KIVEK	BASIN				
Beaverhead							
Lakeview	6700	48	15.3	10/2	7.1	_	5.8
Harcylew	0700	40	10.0	10/2	/ • ±		3.0
Madison							
West Yellowstone	6700	48	6.5			1.5	2.4
Gallatin							
Bridger Bowl	7250	48	17.0	10/1	16.4	16.3	15.6
College Site	4856	54	14.5	10/2	10.1	9.6	7.7
Lick Creek	6860	48	18.8	9/30	18.6	15.1	16.9
Twenty-One Mile	7150	48	10.0	10/2	5.2	3.6	3.8
Missouri Main Stem							
Kings Hill	7420	48	11.8	9/25	6.7	5.3	7.5
Stemple Pass	6350	48	5.9	9/30	3.5	3.0	3.8
Milk							
Beaver Creek	3950	48	20.9	10/2	6.6	7.0	~
Rocky Boy	3950	36	10.1	10/2	7.9	6.6	-
77 - 1 1 (
Yellowstone	(000	4.0	17 (10/1	15.0	0 0	10.0
Battle Ridge Northeast Entrance	6020	48	17.6	10/1	15.3	9.2	10.2
Northeast Entrance	7350	48	9.4	10/2	6.4	4.0	6.4



RESERVOIR STORAGE (Thousand Acre Feet) END OF MONTH

		Usable		Usable Storage					
Basin or Stream	RESERVOIR	RESERVOIR Capacity		Last Year	Average				
COLUMBIA RIVER BASIN									
OCHOIDEN ATTENDED	<u>-</u>								
Flathead	Hungry Horse	3,428.0	2,931.0	2,726.0	3,331.0				
	Flathead Lake	1,791.0	1,694.0	1,700.0	1,699.0				
	Camas (4)	45.2	17.8		24.9				
	Mission Valley (8)	100.3	21.0	12.6	17.6				
Clark Fork	Georgetown Lake	31.0	30.1	29.2	26.7				
	Nevada Creek	12.6	4.1	-	6.5				
	Noxon Rapids	334.6	328.8	331.0	321.3				
Bitterroot	Como	34.9	0.4	0.2	1.9				
	Painted Rocks	31.7	29.5	29.0	25.2				
MISSOURI RIVER BASI	N								
Beaverhead	Clark Canyon	328.9	136.7	127.5	103.0				
Beavernea	Lima	84.0	39.2		17.3				
Ruby	Ruby	38.8	9.5	8.2	8.6				
Madison	Hebgen Lake	377.5	326.4	326.4					
	Ennis Lake	41.0	37.4	39.5	36.5				
Gallatin	Middle Creek	8.0	3.7	3.5	2.4				
Missouri	Canyon Ferry	2,043.0							
	Hauser & Helena	61.9	52.0	29.1	58.6				
	Lake Helena	10.4	7.0	10.4	9.5				
	Holter Lake	81.9	73.9		75.7				
	Smith River	10.7	4.2						
	Durand	7.0	2,8	1.7	3.3				
	Martinsdale	23.1	10.2	5.2	6.6				
	Deadman's Basin								
	Fort Peck								
Sun				9.4					
	Willow Creek			16.5					
	Pi s hkun								
Marias	Lower Two Medicine	16.6	-	0.5	3.5				
				12.9	11.0				
	Swift			14.8					
	Lake Frances								
	Tiber			605.4					
Milk	Fresno			81.5					
	Nelson			45.5					
	Lake Sherburne								
Yellowstone	Mystic Lake								
	Tongue River			-					
	_			9.1					
Big Horn	Big Horn Lake								





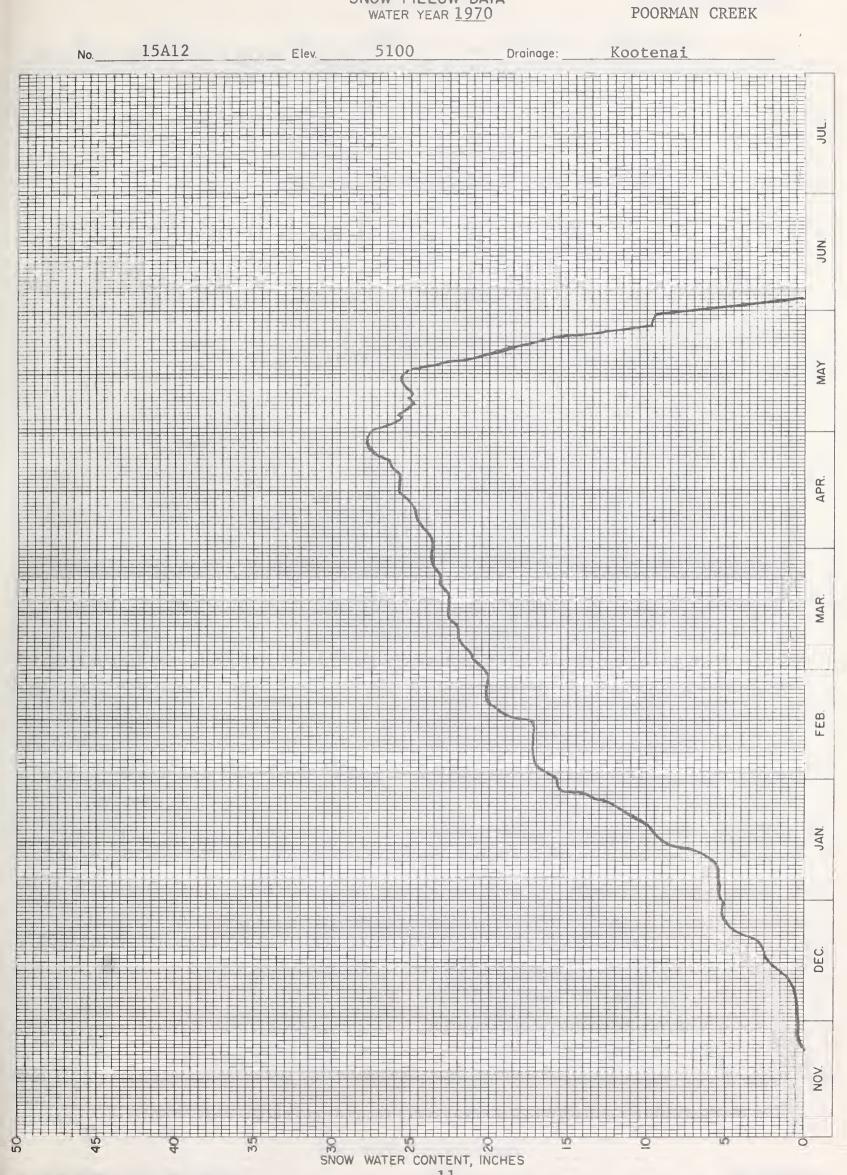


No. 15A05 Elev. 4250 __ Drainage. ___ Kootenai JUL. JAN NOV. SNOW WATER CONTENT, INCHES

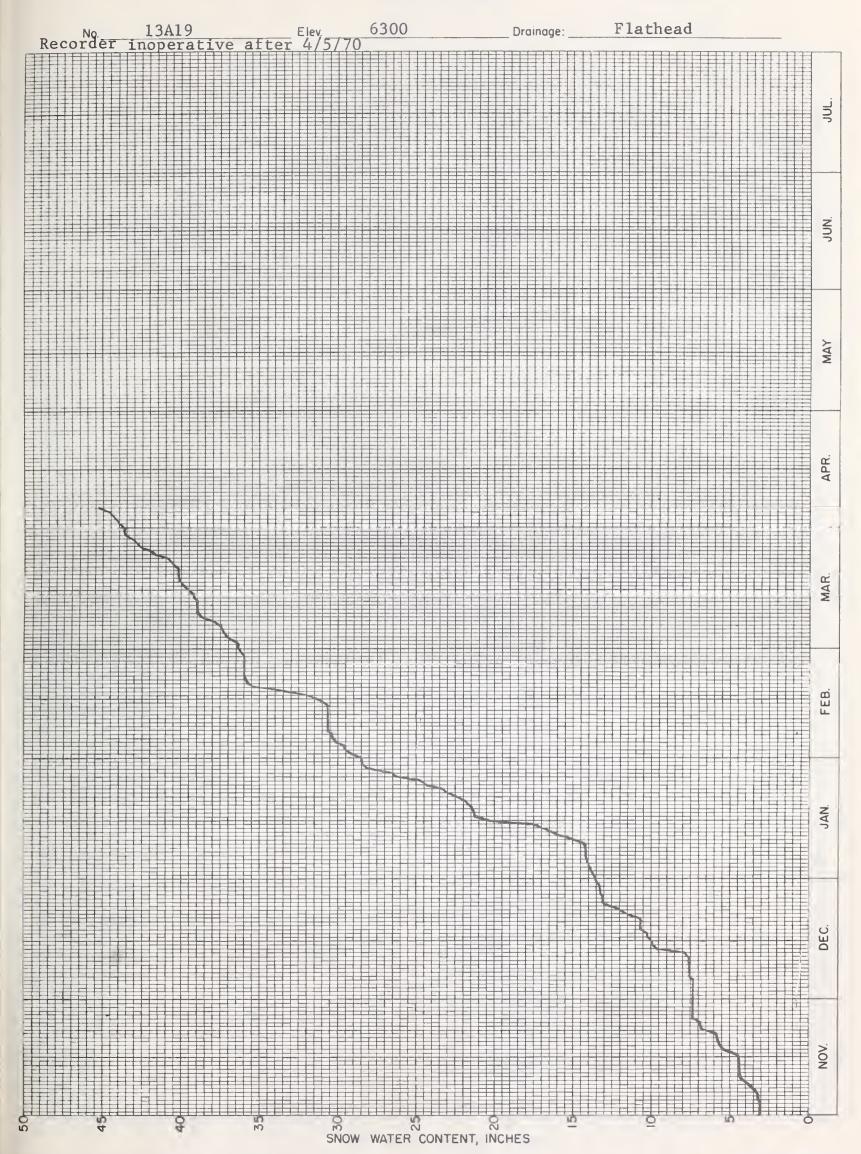


15A03 6450 Kootenai Drainage: __ SNOW WATER CONTENT, INCHES

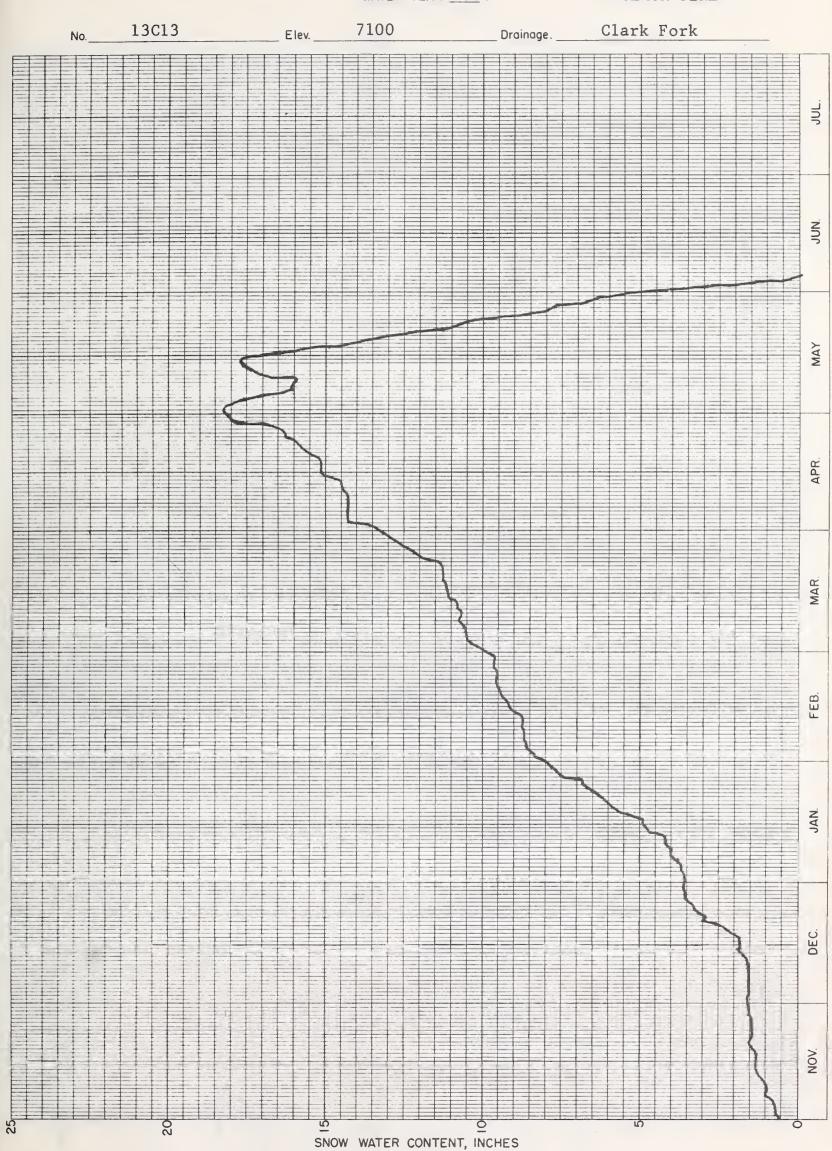




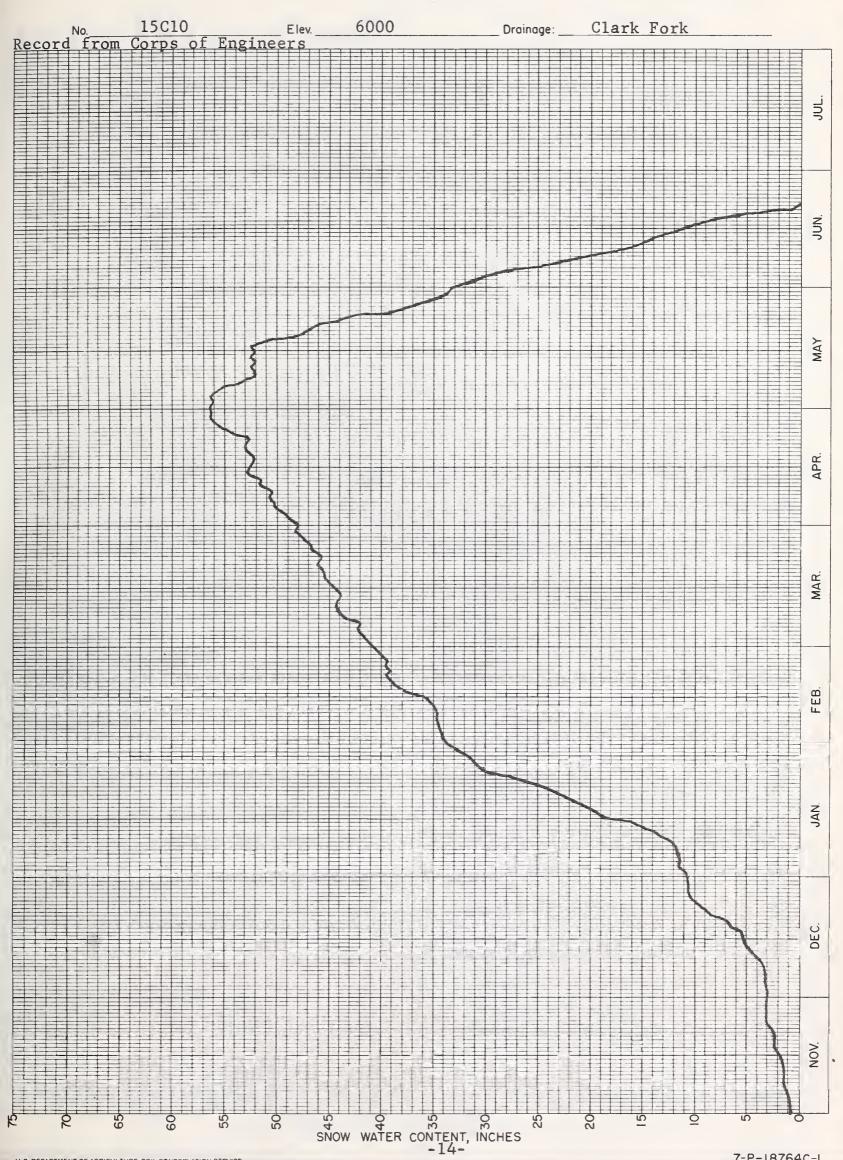






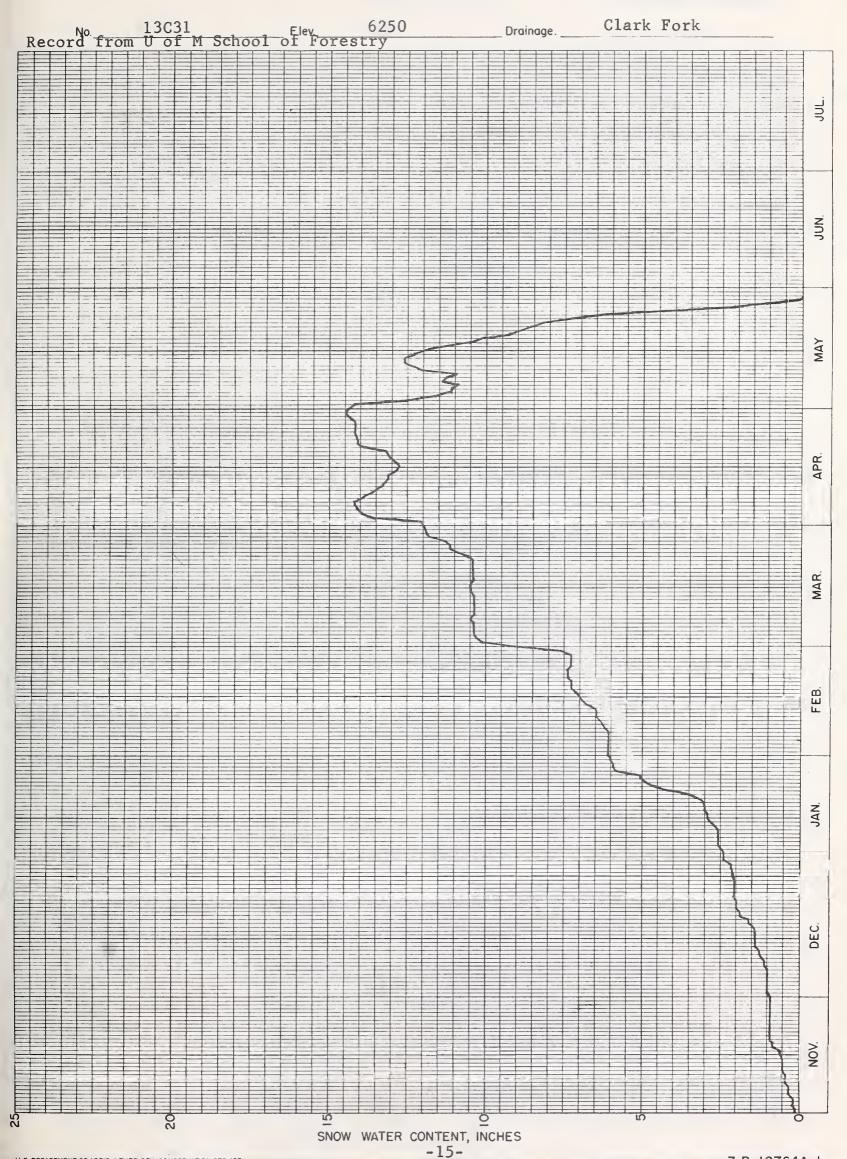




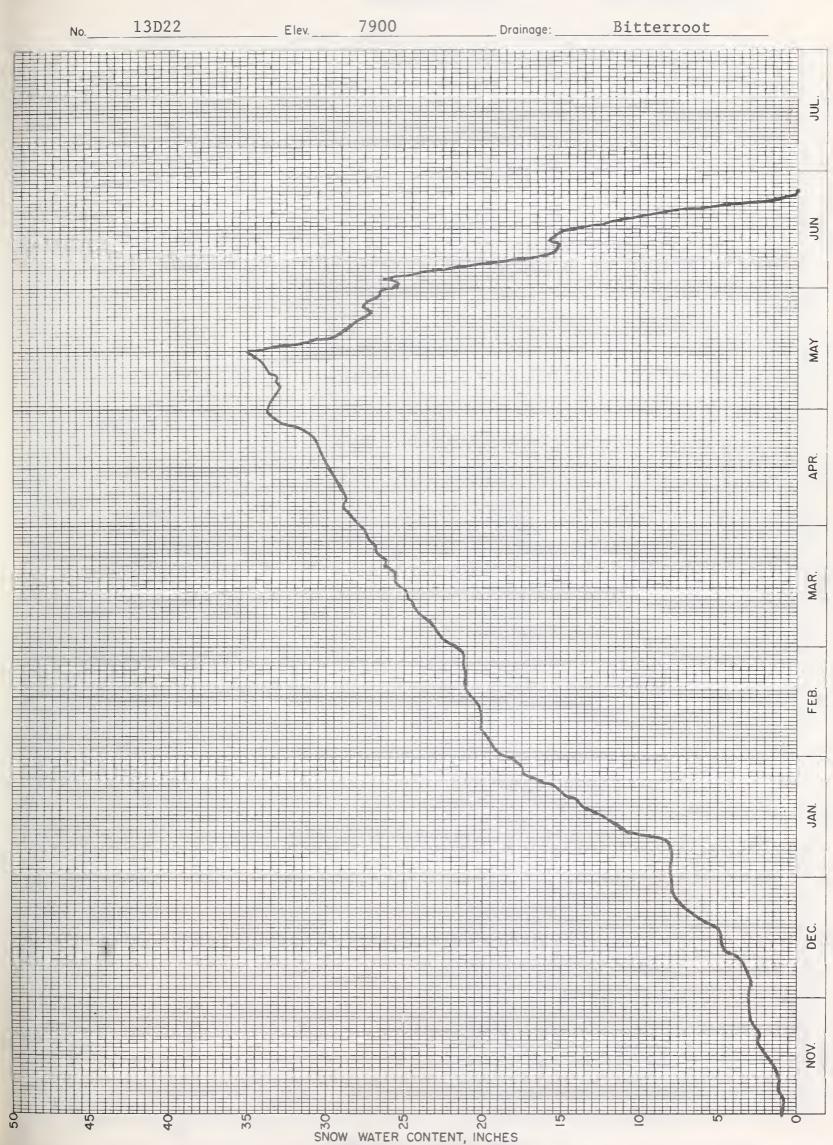




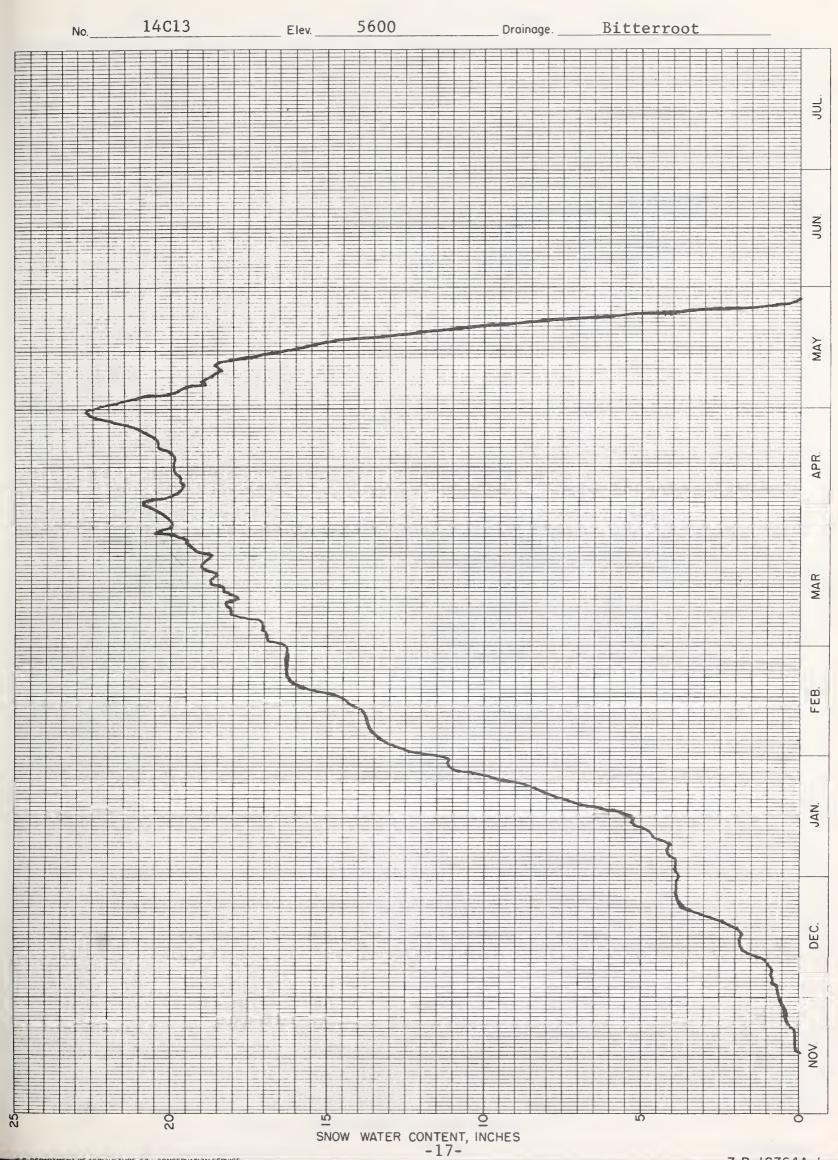
7-P-18764A-L



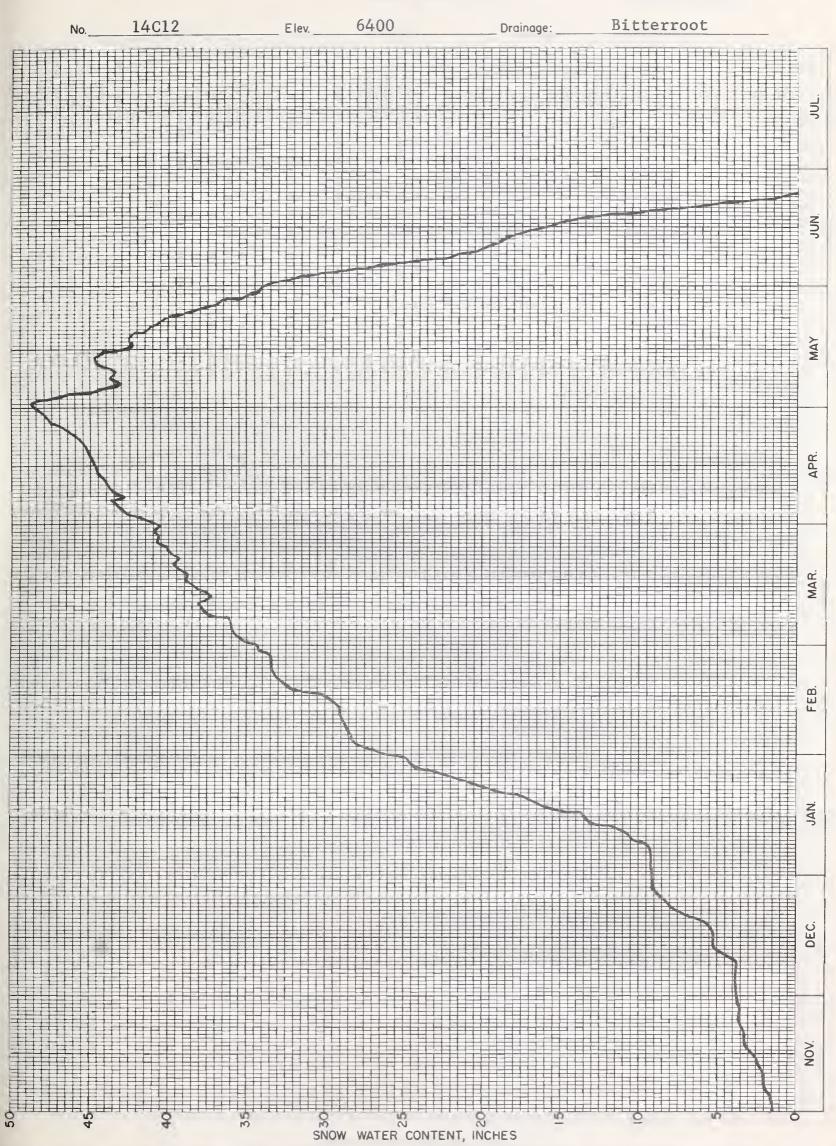




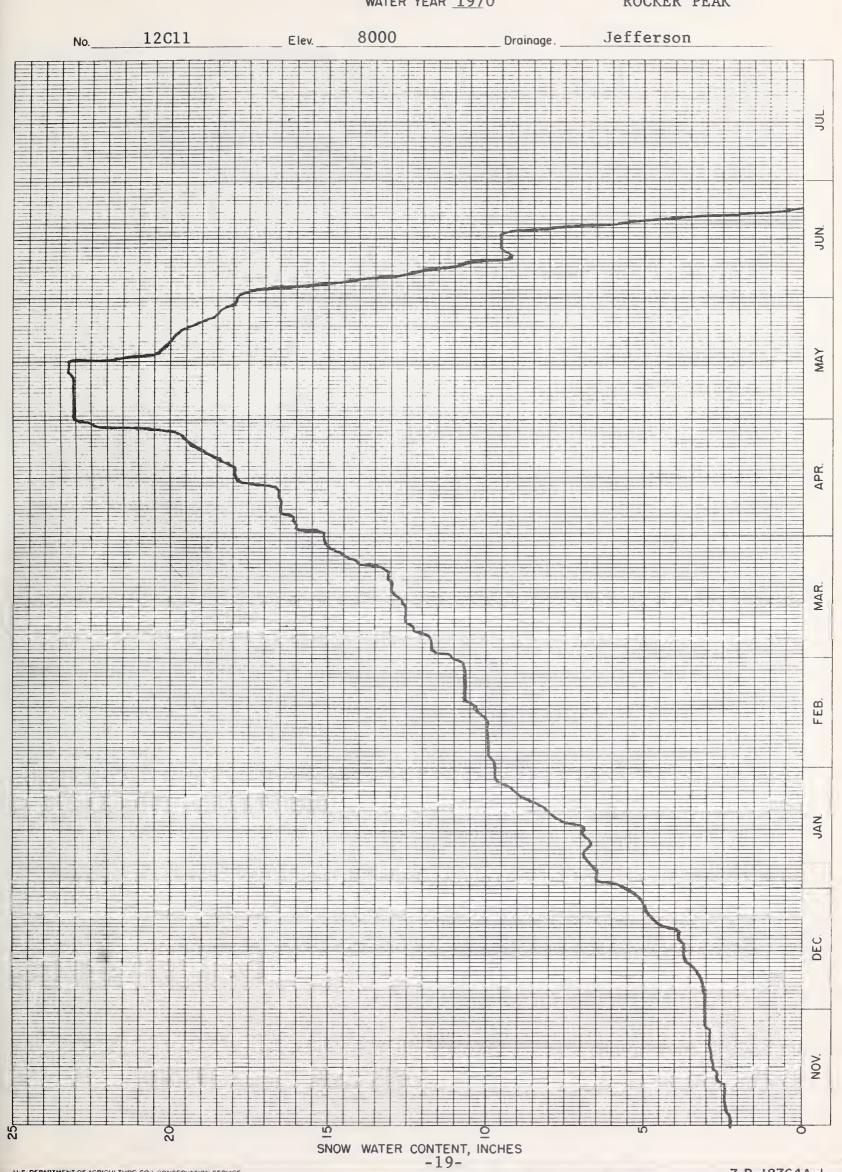




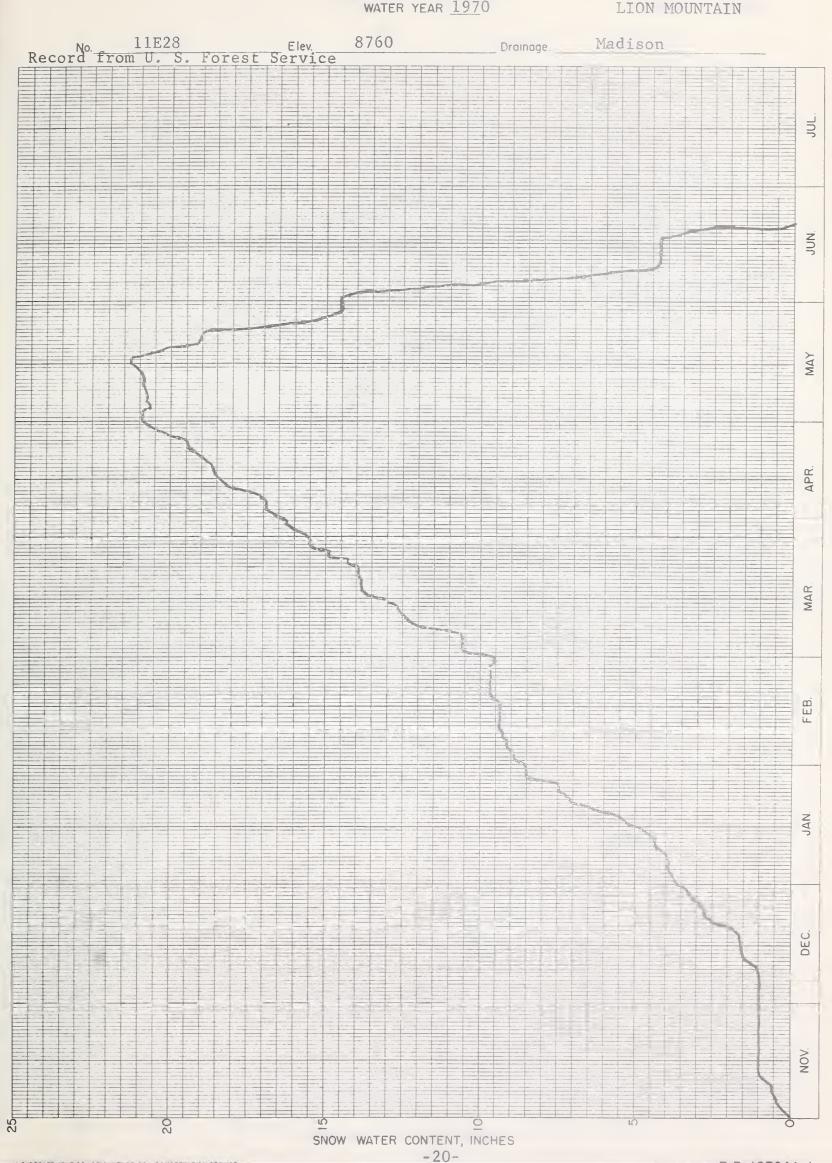








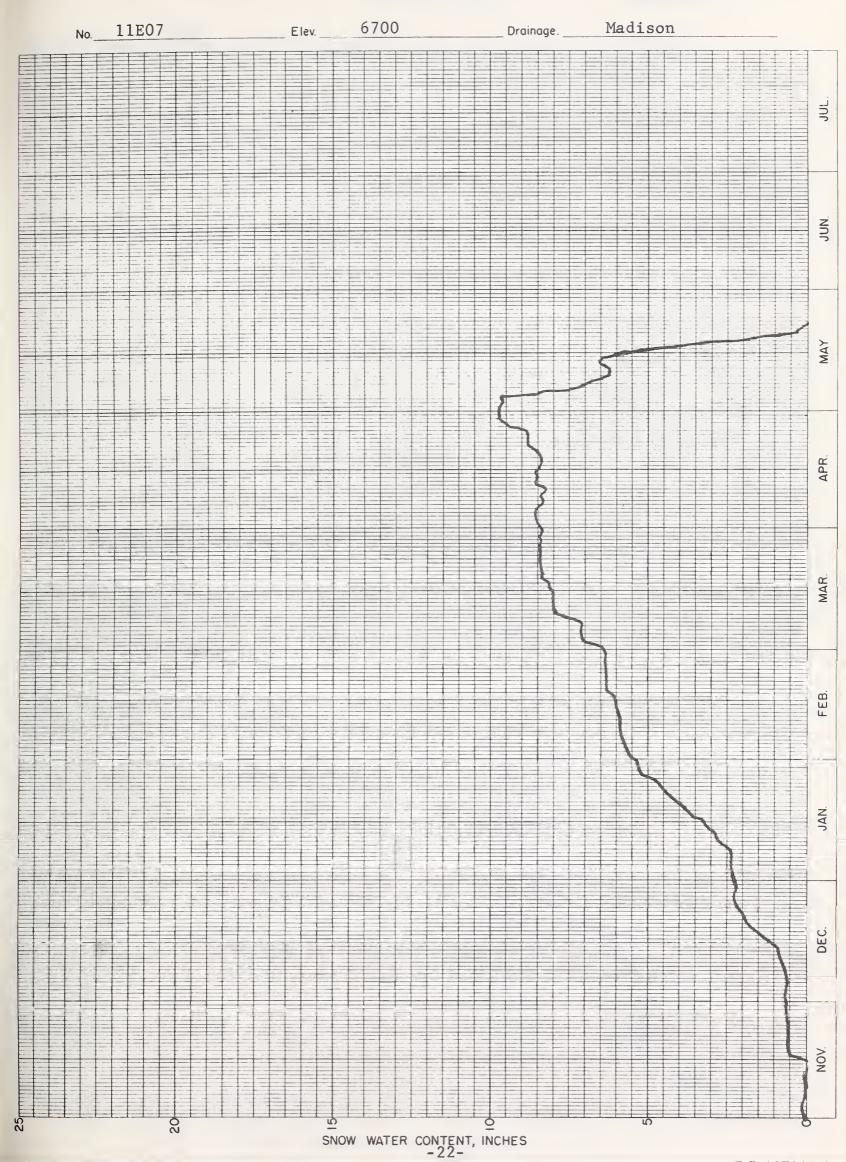




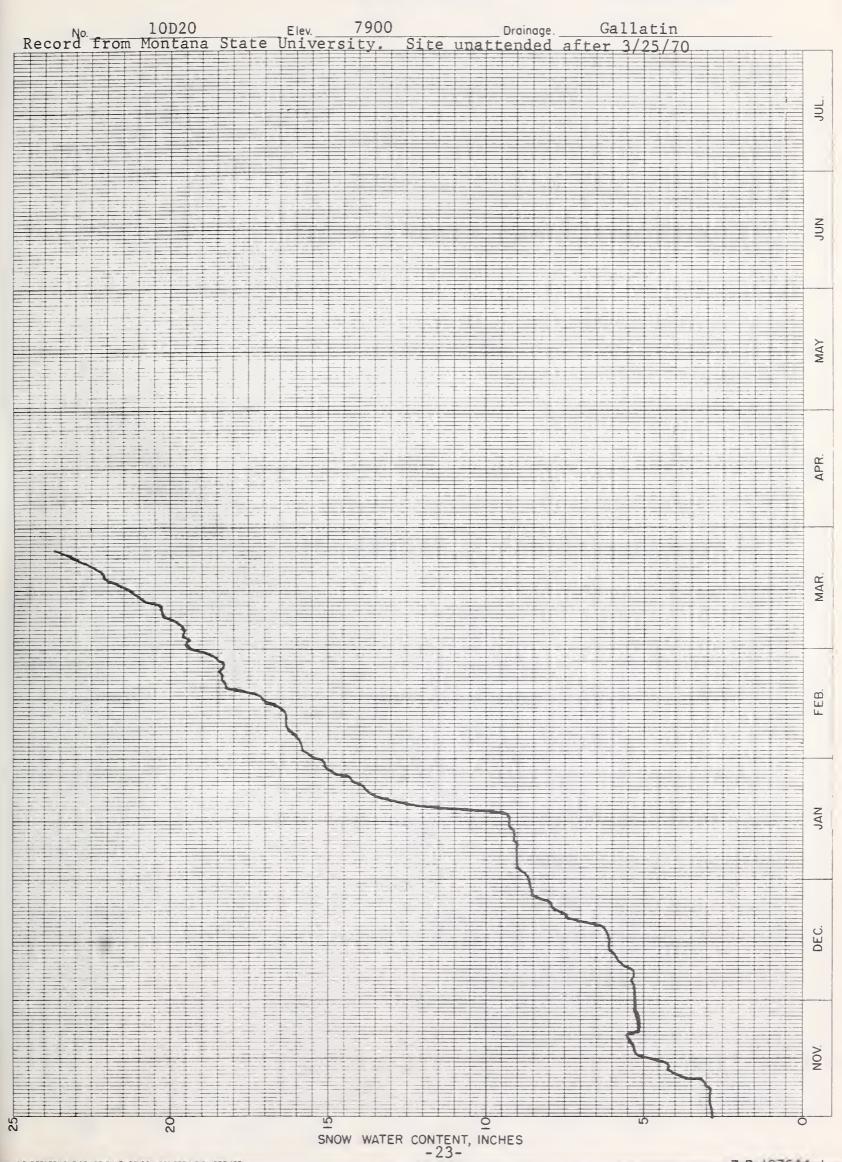


Madison 11E31 Drainage: SNOW WATER CONTENT, INCHES







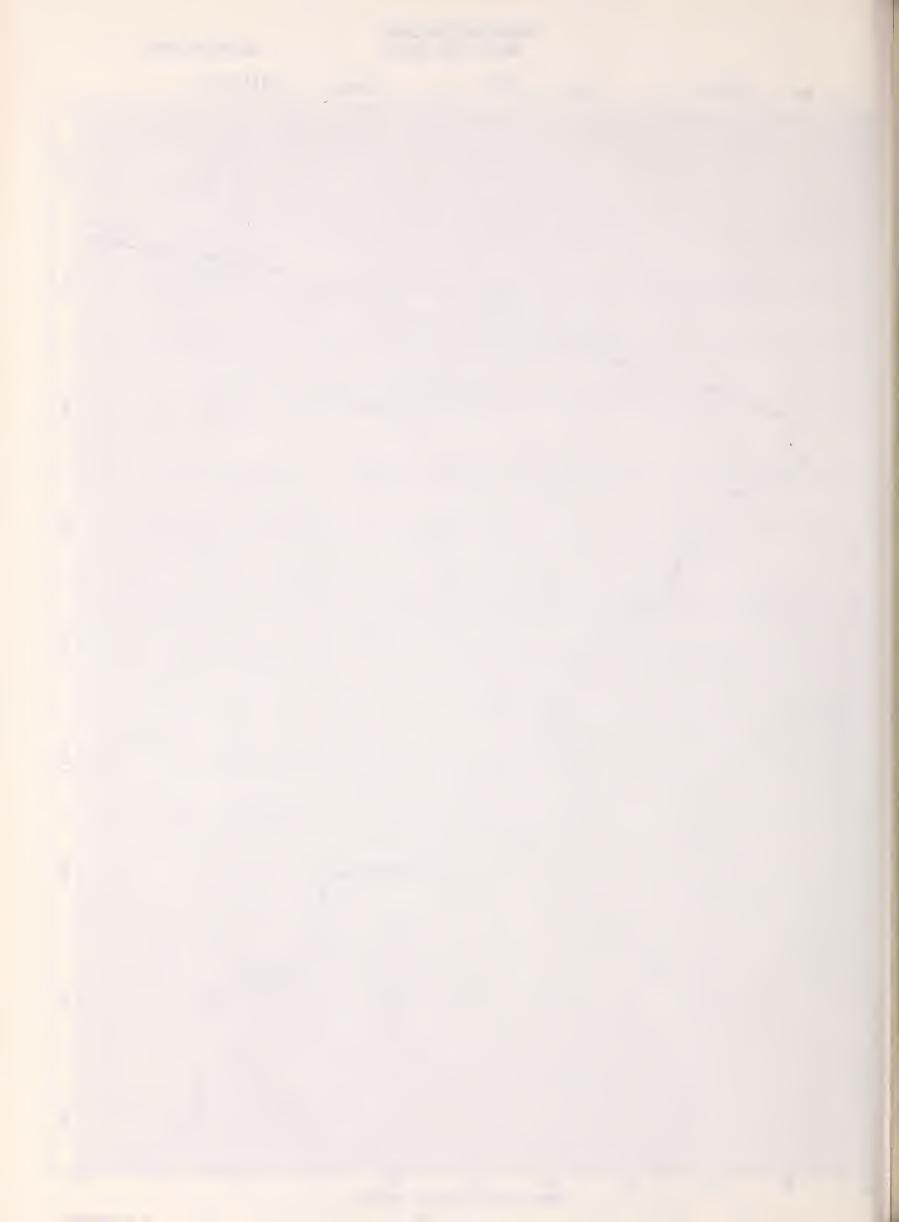


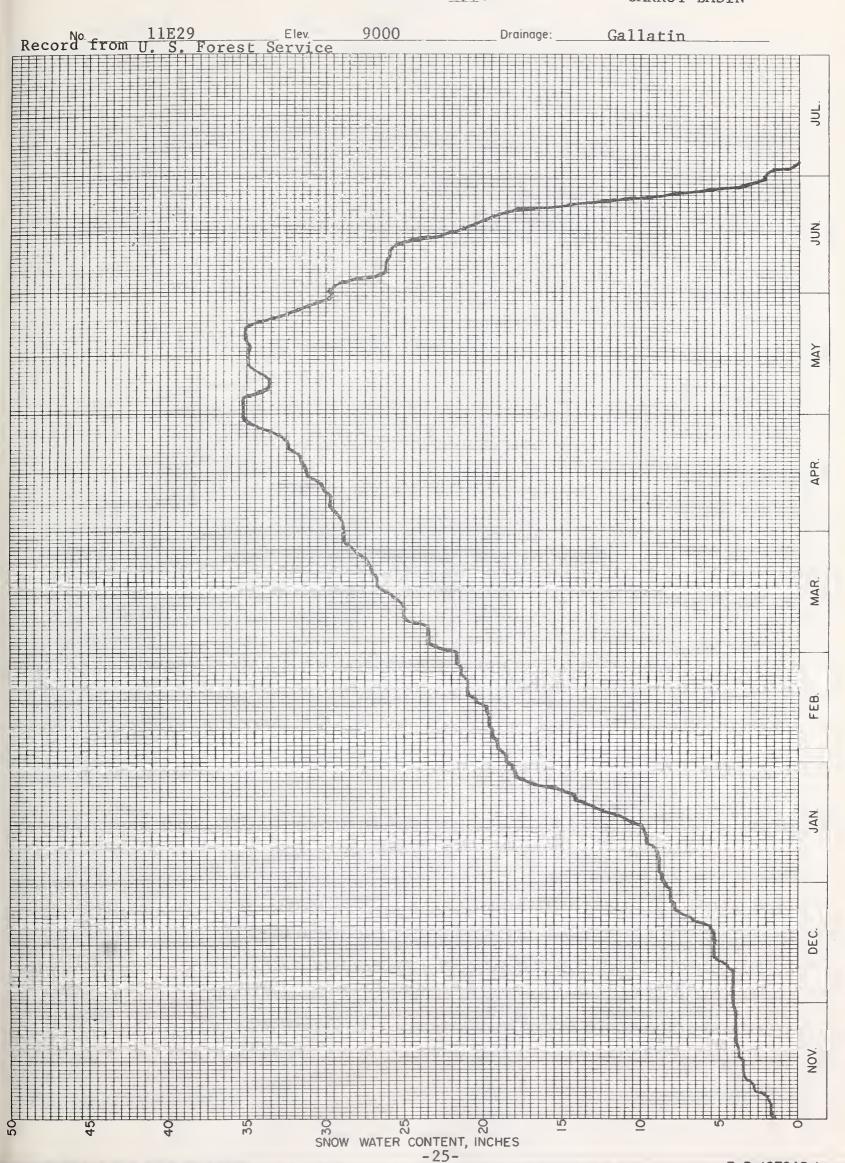


SNOW PILLOW DATA WATER YEAR 1970

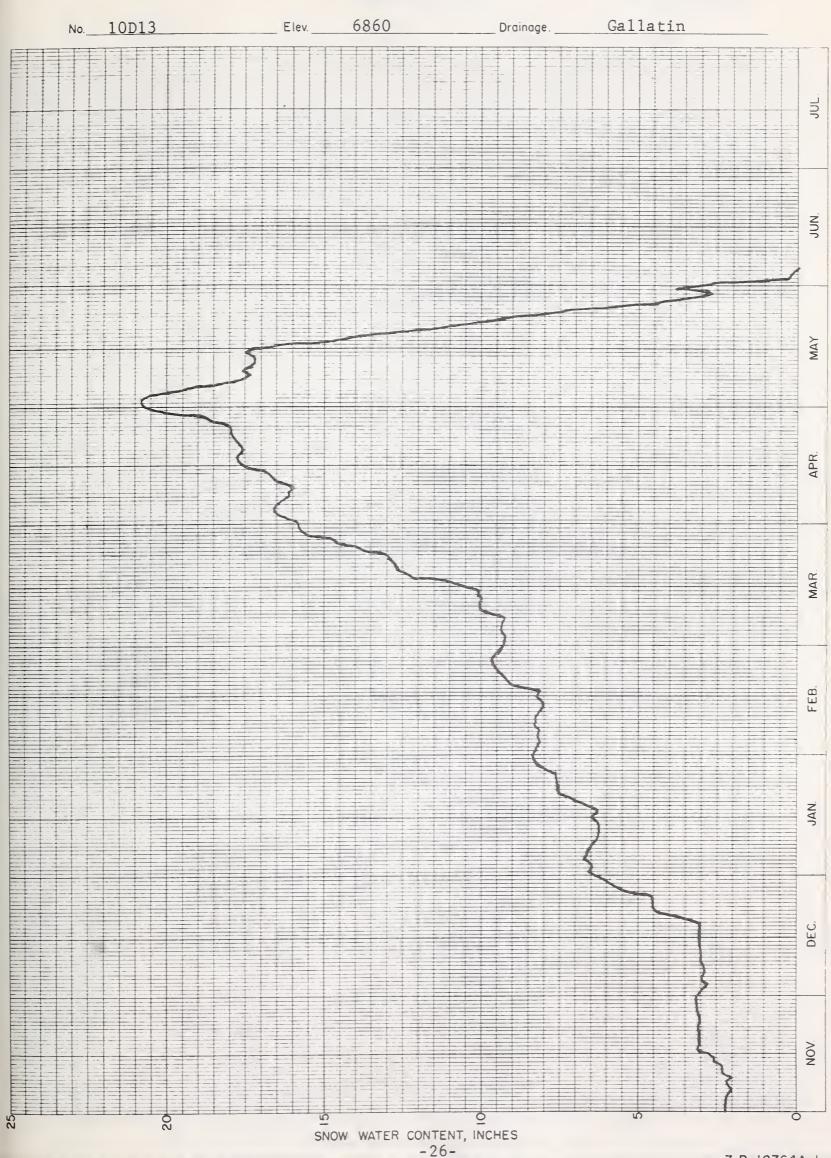
BRIDGER BOWL

10D15 Gallatin Drainage: MAY SNOW WATER CONTENT, INCHES

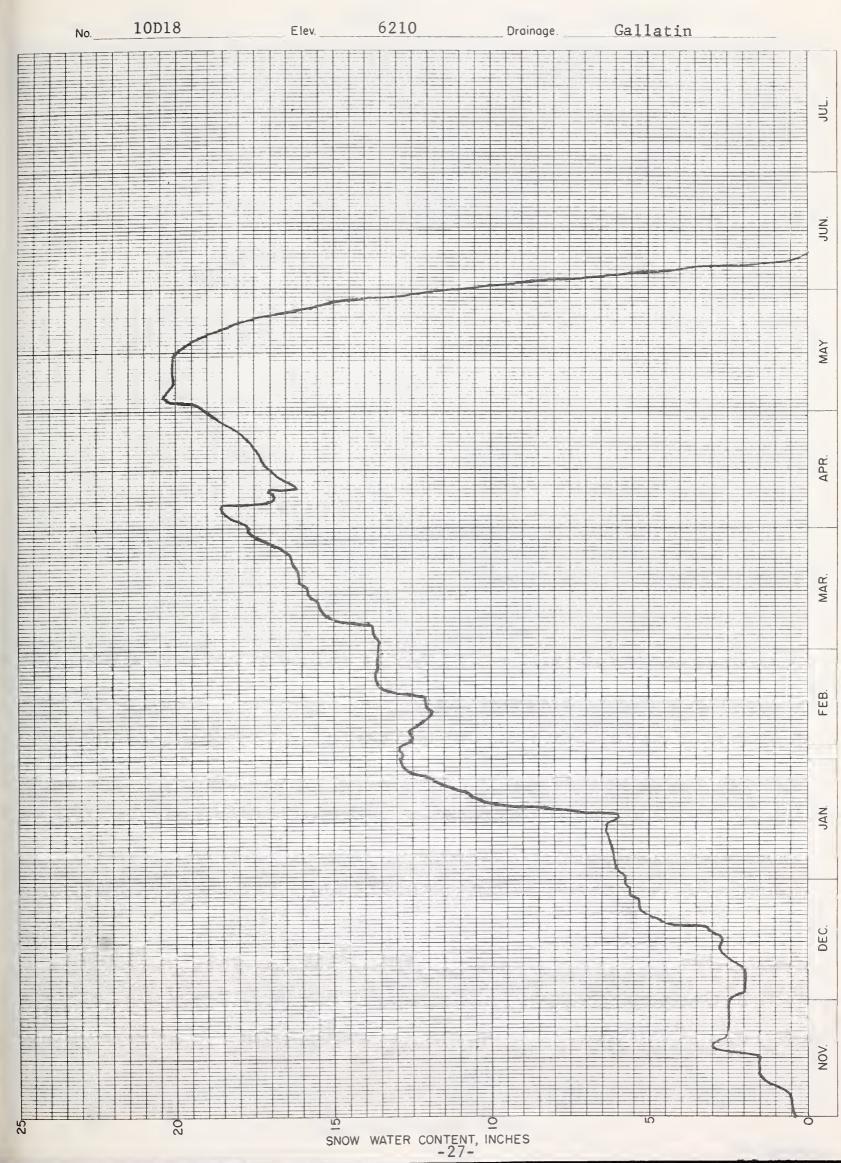








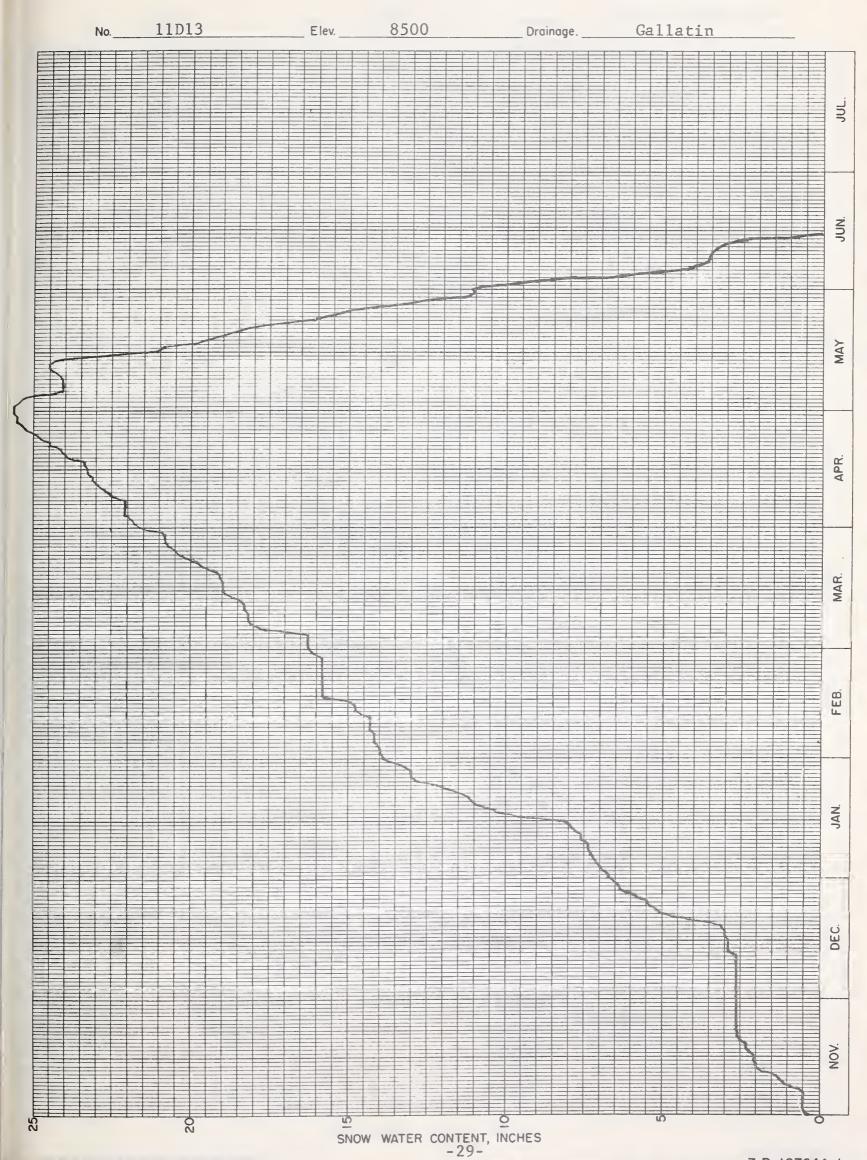


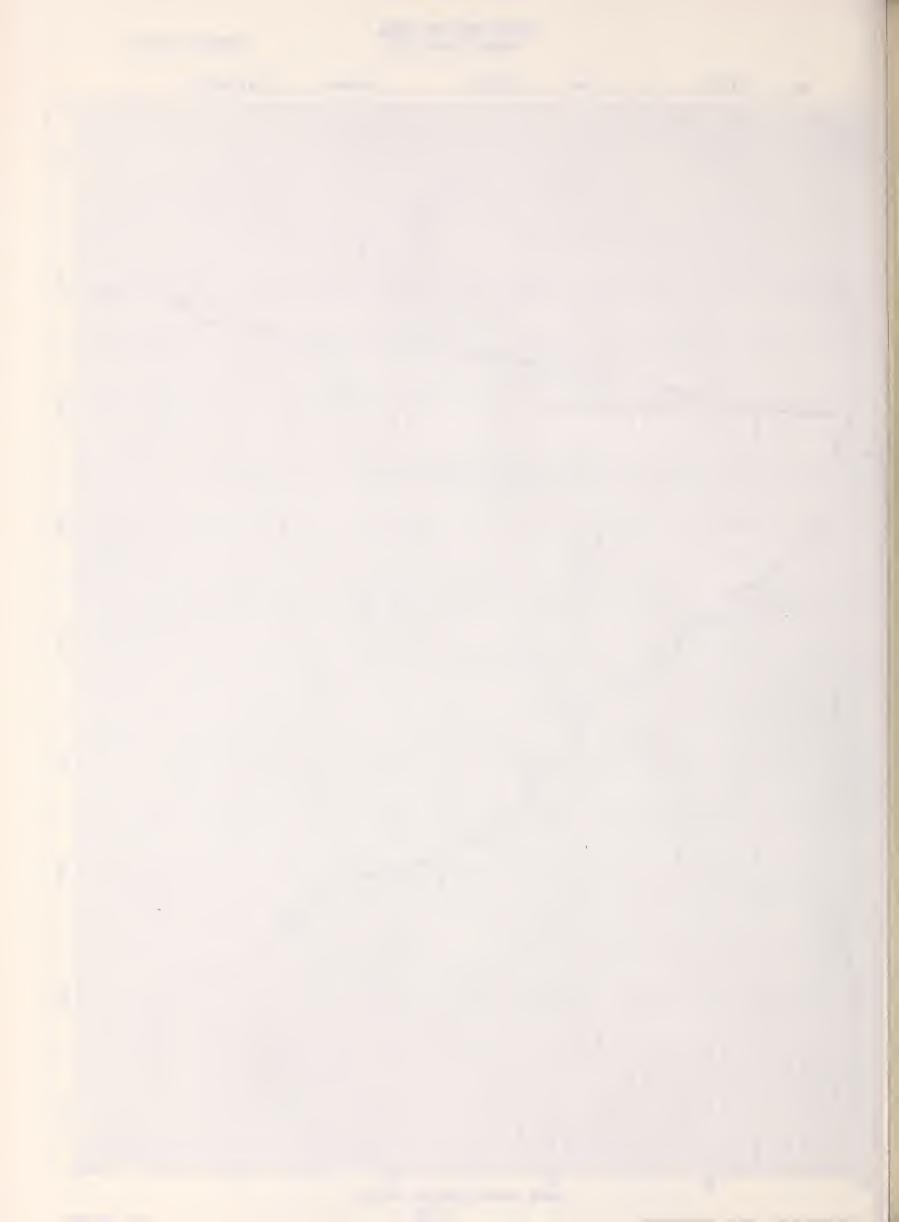




10D16 8100 Gallatin Elev. _ Drainage: MAY SNOW WATER CONTENT, INCHES

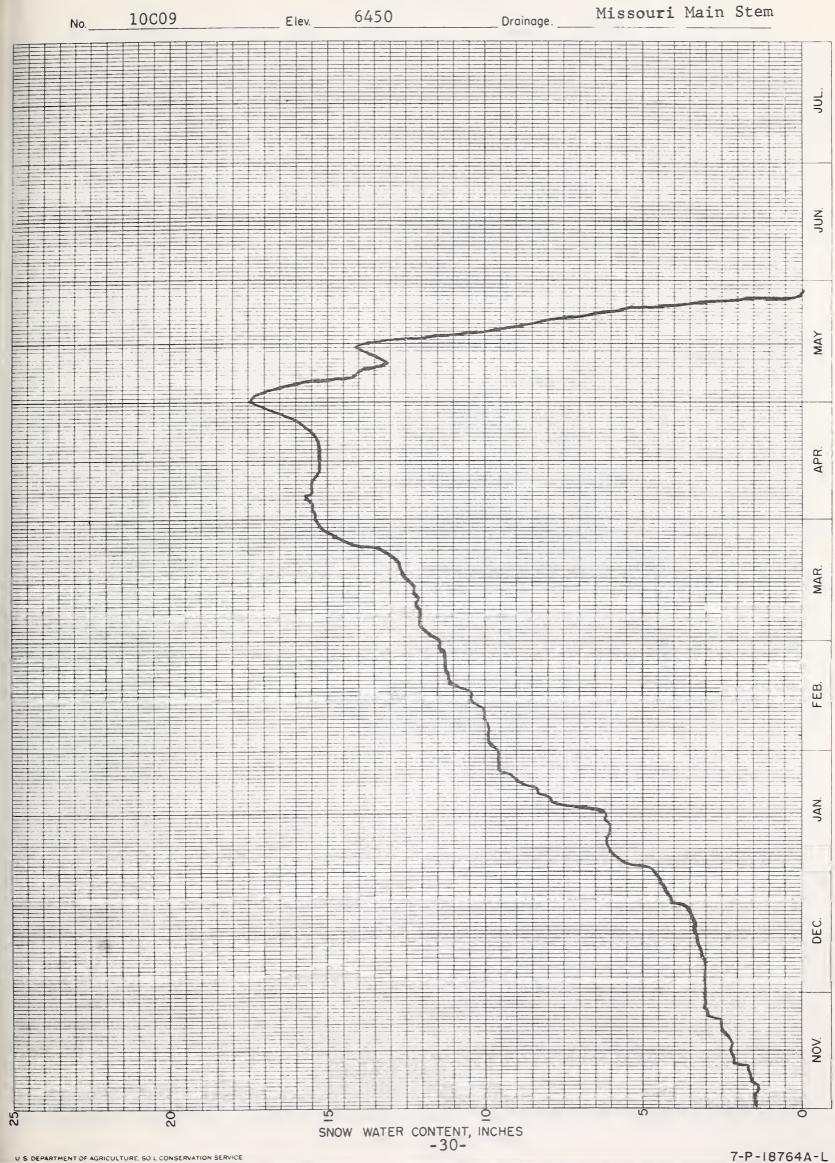




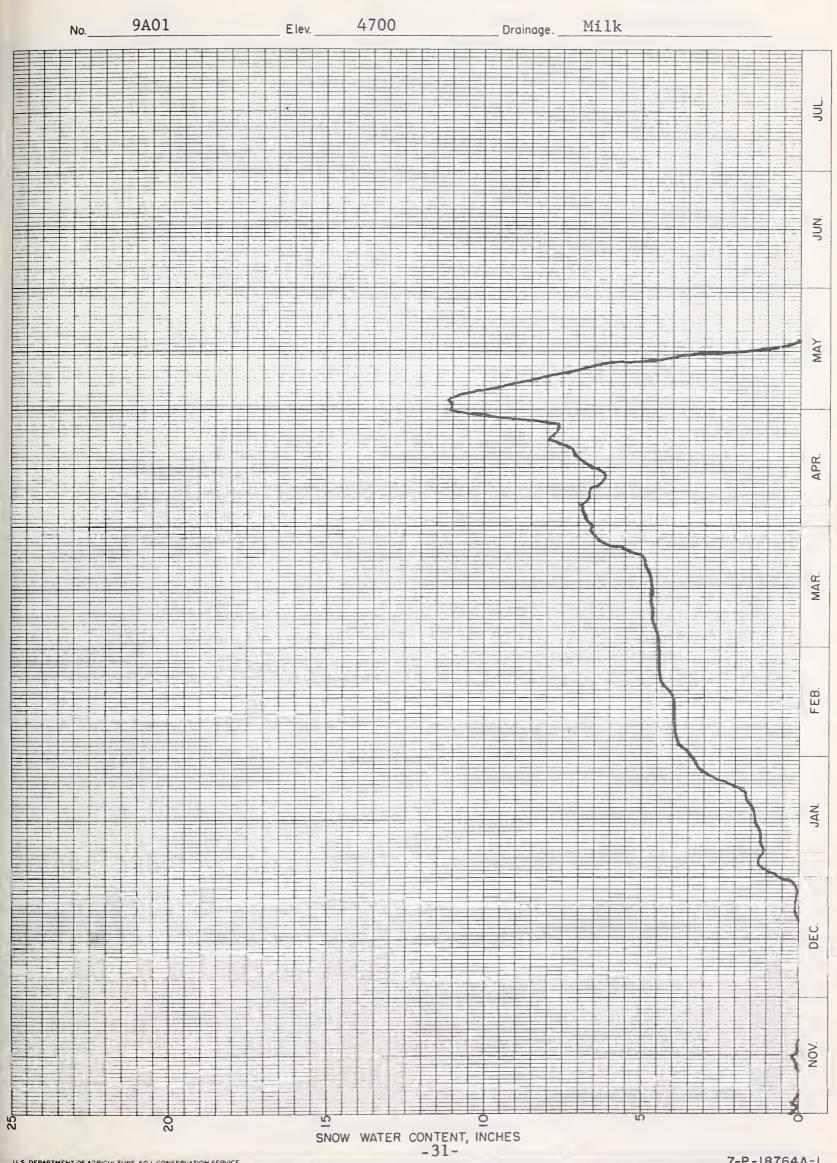


SNOW PILLOW DATA WATER YEAR 1970

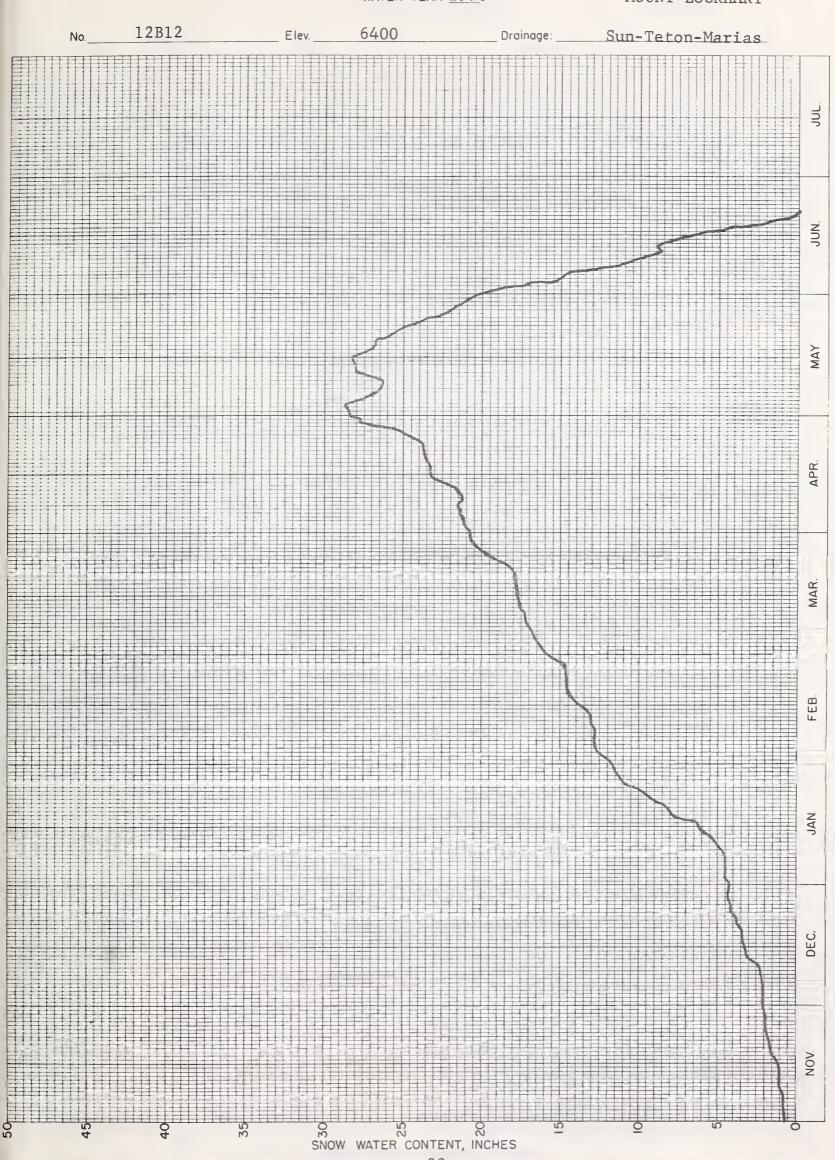
DEADMAN CREEK





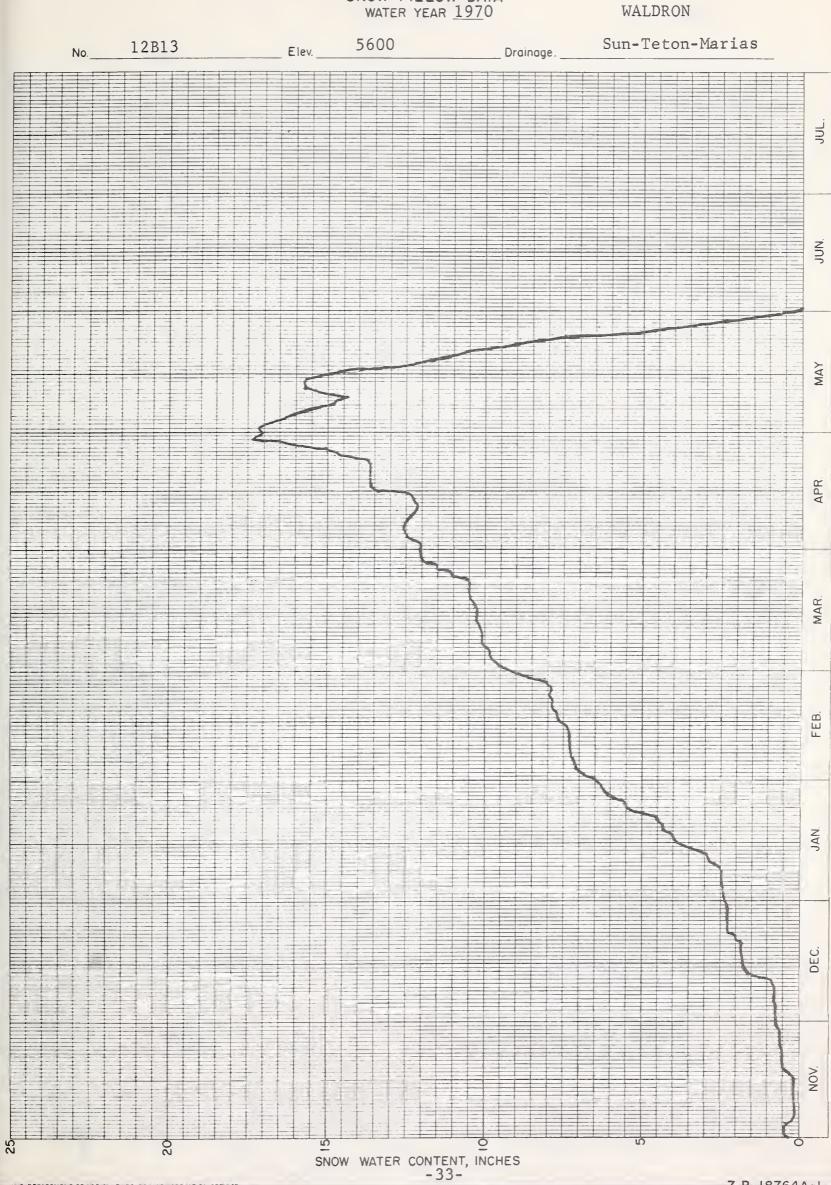








SNOW PILLOW DATA WATER YEAR 1970



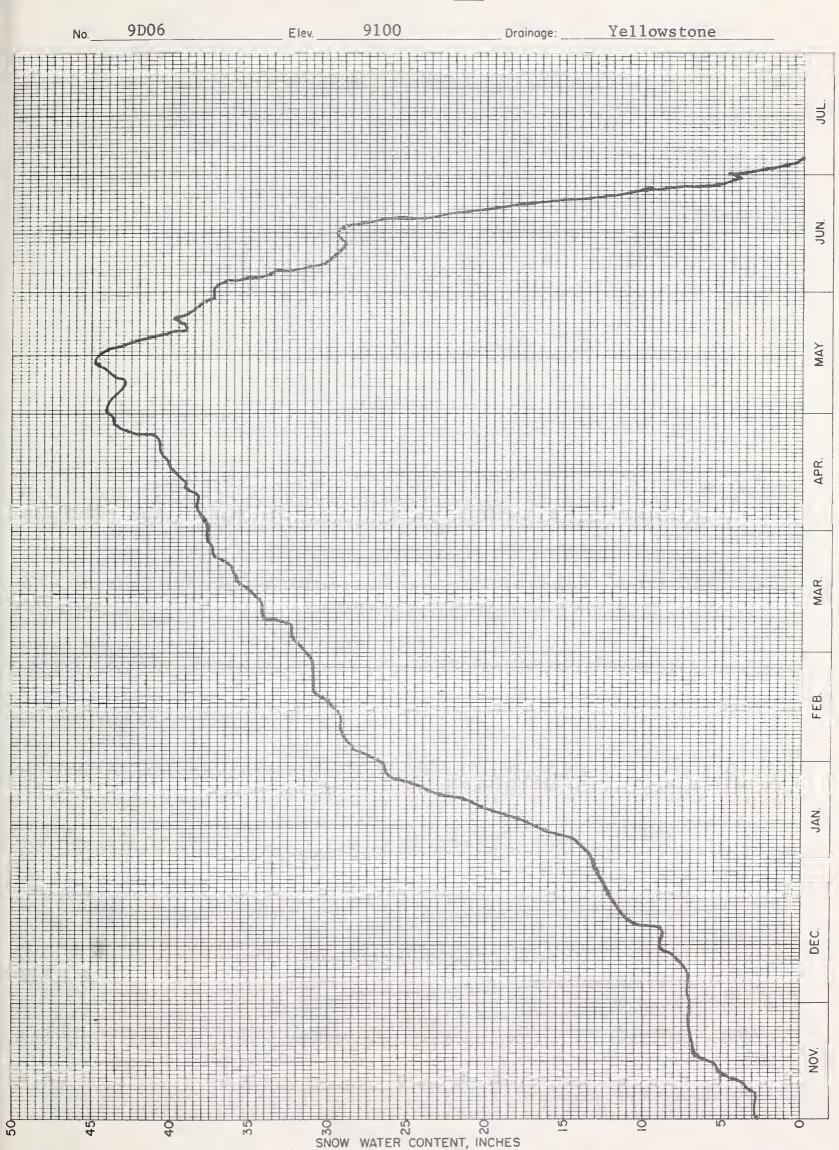


SNOW PILLOW DATA WATER YEAR 1970

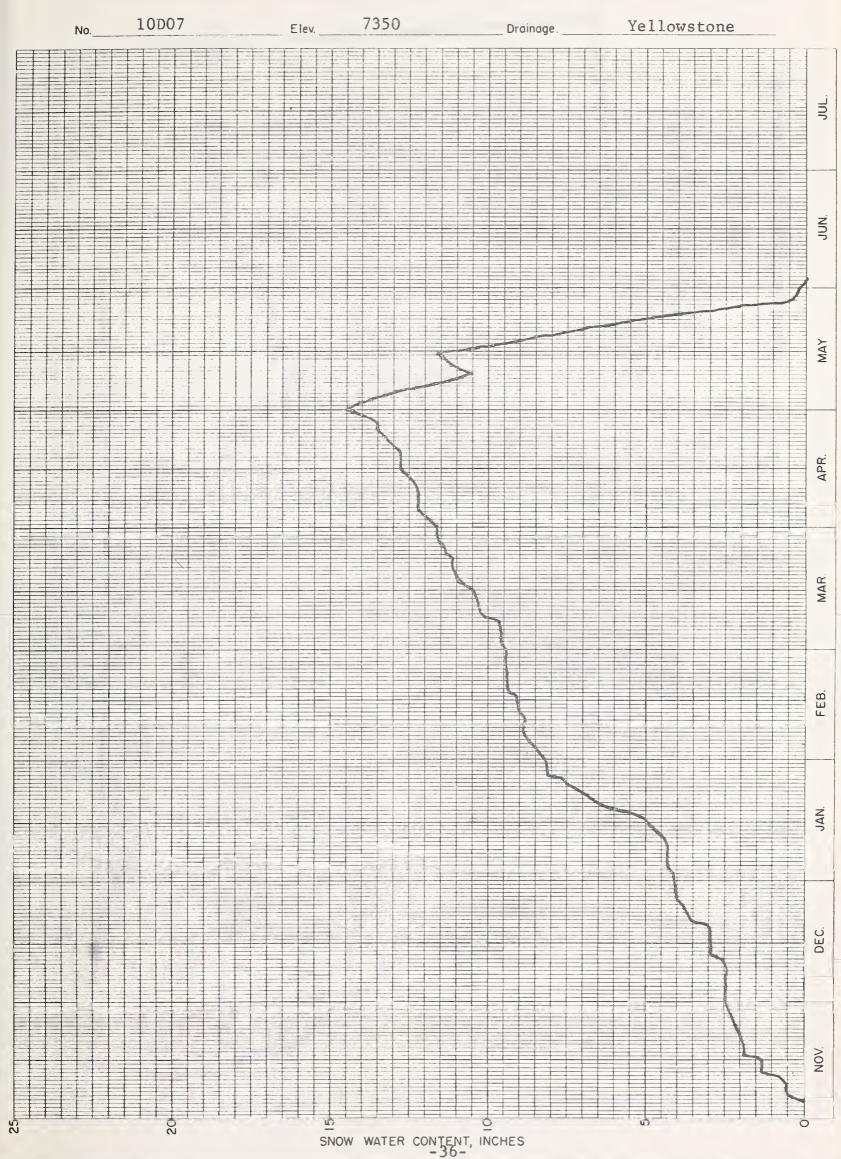
SPUR PARK

10C06 8000 Elev. Drainage: _ SNOW WATER CONTENT, INCHES

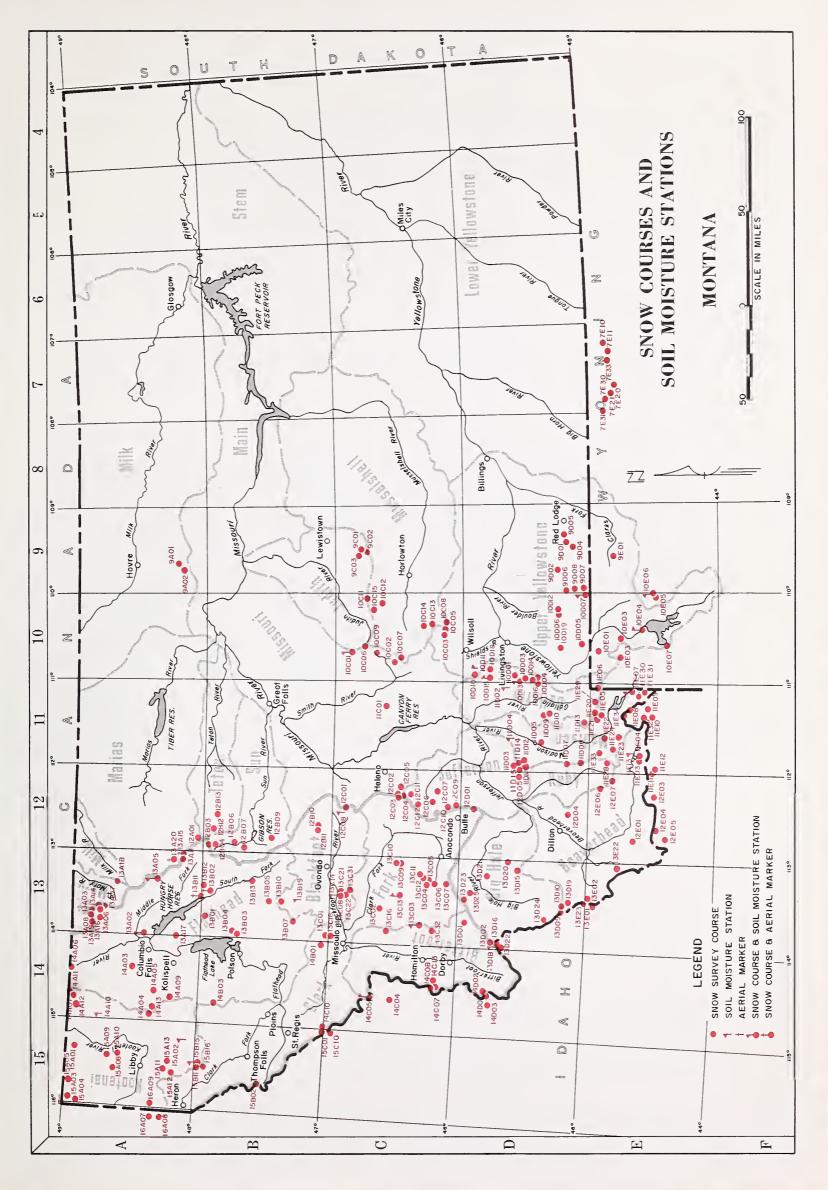












INDEX to MONTAAA SNOW COURSES and SOIL MOISTURE STATIONS

11 11,2 11,5 11,6 11,1 11,1 11,2

Mona, By 2/

	Typ. Range Bogan Dates N B	10E 1961 18E 1937 15E 1936 9E 1935 14E 1966 19E 1960 11E 1960	7. 122 1661 174,5 7. 122 1661 17,2,1,4,5,5,5,6 4.N 10E 1990 1,4,5,5,5,6 4.N 10E 1990 3,4,5,5,5,6 8.S 18E 1960 3,4,5,5,5,6 9.S 15E 1966 3,4,5,5,5,6	STATIONS ER BASIN	25N 30W 1964 Monthly 34N 25W 1964 Monthly 26N 29W 1964 Monthly	31N 19W 1956 Monthly 30N 14W 1950 Monthly	8N 15W 1965 Monthly 13N 15W 1961 Monthly 17N 15W 1963 Monthly 6N 17W 1966 Monthly	2S 19W 1962 Monthly 10N 24W 1963 Nonthly	ER BASIN	14S 2W 1962 Monthly	3S 1E 1961 Monchly 13S 5N 1966 Monchly	1N 6E 1966 Monthly 2S 5E 1956 Monthly 4S 6E 1965 Monthly 11S 5E 1963 Monthly	29N 16E 1969 Monthly 13N 8E 1963 Monthly ZBN 16E 1969 Monthly 13N 7W 1963 Monthly	2N 7E 1960 Monthly 9S 14E 1962 Monthly			J. February 1, March 1, April 1, May 1, Ma	urvey as follows:	WAN Agricultural Experiment Scatton U. of M. School of Portestry Department of Emergy, Mines & Resout U. S. Burgen of Stpoil Fieldstive & W Privete Components Soil and Water Comervation District
	Mumber Elov. Sec.	ONE RIVER 10005 7500 9001 7890 9007 8150 10005 8400 9006 9100 10006 7850	cance 100012 8800 16 10007 7400 33 10000 6500 10 10000 8100 13 10000 8100 13 10000 8100 13 10000 8100 13 10000 8100 13 10000 8100 13 10000 8100 13 10000 8100 13 10000 8100 13	SOIL MOISTURE STATH COLUMBIA RIVER BASIN	ER 15815M 3800 5 14A10M 3000 5 15A02M 3050 2	RIVER in 13A02N 5600 24 13A05N 5250 34	K RIVER 13C13M 7100 26 st 13C4M 400 11 113B19M 4030 21 1t 13C03M 7260 30	T RIVER 13D18M 7100 4 14C05M 5250 11	MISSOURI RIVER	D RIVER 11E13M 6700 23	RIVER 11D04M 4800 7 one 11E07M 6700 34	100 100	IVER M	ONE RIVER LUDIIM 6020 32 tance 10D07M 7350 33		Civil	LEGENY Numerals 1,2.3,4,5,5½,6 refer to January 1, Fe and June 1.	makes the enow	S. Sall Connegvation Service 7. S. Sall Connegvation Service 8. S. Goological Survey 9. S. Mattona Invest Company 10. S. Mattonal Park Service 11:
	Drainage Beain & Course Name		Monument Peak Northeard Earance Porcupine R.S. Sacalbaca Sacalbaca Timber Fork Shields Timber Rosek Week Rosebud White Mill		KOOTENAIRIV Barce Trail Murphy Lake R.S. Raven R.S.	FLATHEAD RIV Ossert Mountain Marias Pass	CLARK FORK Black Pinc Black Pinc Lubrecht Forest Seeley Lake Skalkaho Summit	BITTERROOT Cibbons Pass Lolo Pass		BEAVERHEAD RIVE Lakeview	MADISON RIV Red Bluff West Yellowstone	GALLATIN RIVER Bridger Bowl College Site Lick Greek Twenty-One Mile	MISSOURI RIV Beaver Creek Kings Hill Roeky Boy Stemble Pass	YELLOWSTONE Bartle Ridge Northeast Entrance			1/ Numerals 1 and June 1.	2/ Numorals r	1. U. S. 2. U. S. 3. U. S. 6. V. S. 6. U. S.
	Mons. By 2/	1,12 1 1,12 1,12		1 7 7 7 7 1 1 1 1 1 1 1 1 1 1 1 1 1 1 1		6-66-	2,000000	1,3,6	1112				00-2-00	E, 1 € E E E	г	1 - 2 - 1	5222	ч	
	Ponouring Dates M	3,4,5 3,4,5 3,4,5 3,4,5 3,4,5	2,4,5 4,6,5 4,4,6 4,4,6 5,44,6	2,3,4,5,5\\ 2,3,4,5,5\\ 2,3,4,5,13,4,5,13,4,5,1,12,3,4,5,5,1,5,3,4,5,5,5,5,1,6,5,5,1,6,5,5,5,5,5,5,5,5,5,5	5, 5, 6, 6, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7, 7,	1,2,1 2,2,1 2,2,1 2,2,2 3,2,2,2 6,5,2	ี ผู้คู่คู่คู่คู่คู่ 	1,2,3,4,5	1,2,3,4,5,5½,6 3,4,5 1,2,3,4,5 1,2,3,4,5	1,2,3,4,5,55,6 1,2,3,4,5,55,6 1,2,3,4,5,55,6 1,2,3,4,5,55,6	2,3,4 1,2,3,4,5,5½,6 3,4,5 1,2,3,4,5	1,2,3,4,5 1,2,3,4,5	4444444 000000000000000000000000000000	1,2,3,4,5,5½,6 1,2,3,4,5 1,2,3,4,5 1,2,3,4,5	1,2,3,4,5	2,4,6,6,6 2,4,4,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,6,		ن ال	3,6,5 1,6,5 1,4,5 1,2,3,6,3,
	Recerd Bagnn	1967 1963 1963 1967 1963	1963 1963 1969 1967 1968	1962 1966 1967 1941 1938		1934 1961 1965 1967	1968 1965 1961 1965 1965	1934	1963 1963 1965 1967	1935 1964 1963 1963	1939 - 1966 1967 1967	1967 1963 1936	1969 1969 1969 1969 1969	1934 1941 1934 1935 1935	1935	1964 1969 1949 1948	1934 1969 1969 1949	1949	1966
	Ranga	38 28 38 38 38	11W 16W 13W 15W 15W 17W	24 74 74 74 75 75 76 76 76 76 76 76 76 76 76 76 76 76 76	2W 2W 2W	3E 1E 2W 3W	38 38 38 38 18	200	31E 4E 6E	6E 6E 3E 7E	6E 6E 2E 5E	16E 3E 5W	11E 10E 8E 10E 9E 12E	16E 7W 6W 6W	MS.	11W 11W 10W 10W	10W 9W 9W 10W	IOW	176. 181: 183:
	Š	45 95 125 45 115 45	35 85 15 2N 2N 55	0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	S 8 8 7 8 7 8 7 8 9 7 8 9 7 9 9 9 9 9 9 9	115 65 115 115	148 128 38 108 108	138	55 65 10 105	4S 4S 6S 1N	38 58 98 118	28N 9N 8N	N11 N11 N8 N9 N11 N11	13N 28N 13N 8N 8N	Z Ø	27N 28N 23N 20N 26N	22N 25N 25N 25N	75N	Z Z Z
	5000	2 8 14 17 17 24 24 24 24	7 111 24 3	8 13 16 21 10 17			28 31 24 33 17 19		3 25 18			2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2	34 10 10 16 16	34 22 16 12 13	19	25 33 25 13	20 18 17 32	1/	4 2 L Z
	F.Luv.	88:10 86:00 79:00 785:0 85:00 69:60	8800 8600 8280 7650 8250	7300 7700 6500 6500 7200 8000	8050	6550 7500 6100 8760 7900	7750 7000 7500 7150 8300 7600	6800	7350 8150 7250 9000	6600 6860 7400	6700 8100 8500 7150	5200 7950 6200 6450	7600 7000 8000 6400 7000 8050	7500 5200 6600 6600 6800	8000	6900 5900 5200 5700 6000	7000 6400 5600 5700	00890	8681
	Munber	11003 12607 110015 12606 12005	13026 13019 13021 13025 13024	12C07 12C09 12C10 12C06 12D01 12C11	12C12 11D07 11D12	11E05 11005 11E22 11E28 11E28	11E31 11E23 11003 11E21 11E20 11E33	11607	10014 11009 10015 11629	10003	10001 10016 11013 11E06	9A02 11C01 12C05	10C13 10C13 10C07 10C14 10C02 10C11	10001 9A01 12C01 12C02 12C03	12CO4	13A15 13A20 12B06 12B09 12A01	12812 12812 12813 12804	12803	1632 9
	Trainage Basin & Course Mare	RUBY RIVER dranham Lakes Clover Meadow Drvide Middle HIII Greek Notch	BIG HOLF RIVER Avandance Lake Torkhrese Lake roothen Mad Lake Palsade Greek Slag-A-Melt Lake	JEFERSON RIVER Berry Keddow Goprer Wountain Noz Perce Greek Picnic Grounds Pipestone Pasa Rocker Penk	Uncle Sam Gulch MADISON RIVER Gall Road Four Mile	Hebgen Dam Jack Greek Lake Greek Lion Mountain Lower Tain	Nadison Pinteau Nadison Pinteau Northian Creek North Nadow Potongeron Park Sentinel Creek Sentinel Creek Song Dagus Divide	West Yellowstone Whiskey Creek GALLATIN RIVER	Arch Falls Sear Basin Bridger Bowl Carrot Basin Davil's Side	Devil s since Nood Meadow Little Park Mounard Park	New World Shower Falls Taylor Peaks Twenty-One Mile	MISSOURI RIVER MA Bear Paw St. Area Boulder Mountain Chessana Feervoir	Daisy Peak Engle Creek Elk Peak Forest Lide Grasshopper Idynaker	Kings Hill Rocky Boy Stemple Pass Stemple Dass Ten Mile Lower Ten Mile Moddle	Ten Mile Upper SUN-TETON-MARIA	Badger Pass Blue Lake Cabin Creek Five-Bull Fred&Rt Creek	Goat Mountain Mount Lockhart Waldron Vrong Creek	Wrong Midge	AVE A TYPER
N. I.	Moas. By 2/		1 N 1	11,5	2,111,2	2 1 6 1 1 3 3 3 3	22	1,22	1,2	1,2	00 t	3 8 8 7 9 8 7	1 1 1 1 1 1		6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6	, e, e, e, e,	-	1166	0 0 0
	rd Messuring	7 7			4 2 5 6 6 6 6	5,2, .		-	1,2,3	1,2,3		2 2 1 1 1 1 2 2 2 2 2 2 2 2 2 2 2 2 2 2	3,4,5 3,4,5 3,4,5,5,5,6 1,2,3,4,5,5,5,6 3,4,5,5,5,6		8,4,6 8,4,0			۵ ۵, ۳, ۳, ۳ ۵, ۵, ۵, ۵, ۵, ۵, ۵, ۵, ۵, ۵, ۵, ۵, ۵, ۵	
	Record		6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6 6				1957 1948 1948 1948 1951 1951					1936 1936 1939 1936 1936 1936	1960 1969 1937 1934 1960 1950	1937 1965 1968 1960	1922				948
20.76	De Mang	=					174 174 174 174 174 164					138 198 138 138 198 198	18W 18W 17W 19W 23W 23W	24W 19W 23W 23W 23W	14W 17W 16W				2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2 2
10.7	اغ خا	1					25 N 25 N 25 N 26 N 20 N	8 31	8 6 6 6 7 3	142.55	13 60 80 80 80	14N 14N 5N 15N 15N	28 28 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4 4	15 28 28 5N 5N	35N 35N	358 368 368	88		148
San a way way	10 m	<u>=</u>					6130 34 6100 9 3580 24 6200 28	00 26 00 26 50 2	2111222	50 16 50 16 50 19 50 23	50 20 20 20 30 30 30 35 30 35 35 35 35 35 35 35 35 35 35 35 35 35	5500 8 5500 12 7780 19 5500 19 7450 6	5480 28 7000 20 5400 16 7100 4 1940 5		00 24 00 1	<u> </u>	00 12		6930 26 74 27 45 9 8
3	L. Islander	_					34.6 3802 3802 7 3801 1811 3805 652					3005 3007 3007 3006 5006 5001 74	3016 64 3032 70 3001 54 3002 71 6007 59	9 1 1 1 9	3A18 5800 3A03 5600 3A14 4900	3406 55 3408 58 3408 58	3010 76		1204 69 1203 74 1 1 4
	Creinage Basin	A A A A A A A A A A A A A A A A A A A	1 a qua - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 - 1 -		Desert No. "alm Fary From Tolor From Tolor Tric Greek Divide	ell aring ivide	Hi rai reek Note rock ooko S reed bear Mountein Frinkus Like Tyln Oreeks	~ ~ ~ ~ .			22222		222222	21 22 20 20 20 20 20 20 20 20 20 20 20 20	0 0		RIVER	Carter Creek Dad Creek Lake Elk Horn Sprir 4 1. Cold Stone	11 11

Agencies and Organizations Cooperating in Montana Snow Surveys

- U. S. Forest Service
 Region I, Missoula, Montana
 Montana Forests and Ranger
 Districts
- U. S. Geological Survey Helena, Montana Portland, Oregon
- U. S. Army Corps of Engineers Portland, Oregon Seattle, Washington Walla Walla, Washington Omaha, Nebraska
- U. S. Indian Irrigation Service St. Ignatius, Montana
- U. S. Weather Bureau Helena, Montana Portland, Oregon Kansas City, Missouri
- U. S. Bureau of Sports Fisheries and Wildlife Red Rock Lakes Refuge Monida, Montana
- U. S. Bureau of Reclamation Billings, Montana Boise, Idaho
- U. S. Bonneville Power Administration Portland, Oregon

- U. S. Soil Conservation Service Montana, Wyoming, Idaho
- Soil and Water Conservation Districts
 Montana Counties
- U. S. National Park Service Yellowstone National Park Glacier National Park
- Montana Power Company Butte, Montana
- Montana Water Resources Board Helena, Montana
- North Montana Branch Station Agricultural Experiment Station Havre, Montana
- Montana State University
 Agricultural Experiment Station
 Bozeman, Montana
- University of Montana School of Forestry Missoula, Montana
- Water Rights Branch, Dept. of Lands and Forests Victoria, British Columbia
- Department of Energy, Mines and Resources Calgary, Alberta

UNITED STATES DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE

BOZEMAN, MONTANA 59715 P. O. Box 98

OFFICIAL BUSINESS

FEDERAL - STATE - PRIVATE

COOPERATIVE SNOW SURVEYS

domestic and municipal water supply, hydro-electric power water supply for irrigation, necessary for forecasting generation, navigation, Furnishes the basic data mining and industry "The Conservation of Water begins with the Snow Survey"





USDA - NATIONAL AGRICULTURAL LIBRARY BELTSVILLE, MD. 20705 CURRENT SERIAL RECORD